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The MEU has averaged fulfilling under sixty-five percent of Combatant Commanders' requirements over the past five years and these requirements are likely to increase in the future. The MEU is not trained, manned or equipped to face the threats that exist on the high-end of ROMO, It was not designed to execute a 21st Century amphibious assault against a hybrid threat and a failure to address this issue could have significant consequences in the future. A restructured 21st Century MEU, trained, manned, and equipped with both of these shortfalls in mind, is the solution.

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MASTER OF MILITARY STUDIES

THE 21ST CENTURY MARINE EXPEDITIONARY UNIT

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

CHRISTOPHER T. STEELE
MAJOR, UNITED STATES MARINE CORPS
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PREFACE AND ACKNOWLEDGEMENTS

Over the last three years, I was privileged to serve as an Amphibious Warfare Instructor at Expeditionary Warfare Training Group, Atlantic (EWTGLANT). During that time, I had the opportunity to train with and observe each Marine Expeditionary Unit (MEU) and Amphibious Ready Group (ARG) on the East Coast. Additionally, I had the opportunity to work with the Second Marine Expeditionary Brigade, Expeditionary Strike Groups Two and Five, Second Fleet, Sixth Fleet, and Strike Forces NATO. The fact that I was an instructor allowed me to observe these organizations from the outside. The fact that my command contained both Marine Officers and Navy Surface Warfare Officers allowed me to view these organizations from both a Navy and Marine Corps perspective. I emerged from that experience in awe of what the Marines and Sailors of the Amphibious Force were able to accomplish but frustrated by their training, manning, equipping, and organization.

At the end of my third year at EWTGLANT, I became convinced that the MEU should be reorganized. It was trained, manned, equipped, and organized to fight as one Marine Air-Ground Task Force (MAGTF) embarked aboard three amphibious ships. When the MEU deployed, however, it was constantly disaggregated. The Marines of the MEU adapted and accomplished the mission every time, but that is not how our organization should function. We evaluate the threat, analyze the missions, and build a force capable of accomplishing those missions, in the face of those threats.

This thesis is my attempt to do just that. In essence, the "Restructured 21st Century MEU" suggested in this thesis was designed to maximize efficiency at the low-end of the Range of Military Operations and effectiveness at the high-end of the Range of Military Operations.

I would like to thank Dr. Robert Bruce and LtCol Brian Christmas for focusing and challenging my thesis over the last four months. I would like to thank Frank Colangelo for his mentorship in the area of amphibious ship design. I would also like to thank GySgt Ryan Ralph for spending countless hours working through MEU embarkation solutions. Finally, I would like to thank my wife, Mary, for her patience and support during this process.

EXECUTIVE SUMMARY

Title: The 21st Century Marine Expeditionary Unit (MEU)

Thesis: The 21st Century MEU should be restructured. It should be manned, trained, and equipped to function as three separate MAGTF's embarked aboard three separate ships. This MEU should be designed for disaggregated operations on the low-end of ROMO and leverage that design to execute distributed operations on the high-end of ROMO.

Discussion: The MEU, as it is currently configured, is trained, manned, and equipped to function as one Marine Air-Ground Task Force (MAGTF) embarked aboard three amphibious ships. The Combatant Commanders' demand for Amphibious Forces at the low-end of the Range of Military Operations (ROMO) routinely causes this single MAGTF to disaggregate in an effort to manage multiple tasks simultaneously. Disaggregation is the norm and yet the MEU is not trained, manned, or equipped to do it. Some may argue that redesigning a MEU for disaggregated operations may detract from its ability to aggregate and execute missions on the high-end of ROMO. This assertion is invalid. Given the current, and projected future operating environment, a MEU designed for disaggregated operations would actually be better prepared to execute distributed operations against threats on the high-end of ROMO.

Conclusion: The *status quo* is unacceptable. The MEU has averaged fulfilling under sixty-five percent of Combatant Commanders' requirements over the past five years and these requirements are likely to increase in the future. The MEU is not trained, manned or equipped to face the threats that exist on the high-end of ROMO. It was not designed to execute a 21st Century amphibious assault against a hybrid threat and a failure to address this issue could have significant consequences in the future. A restructured 21st Century MEU, trained, manned, and equipped with both of these shortfalls in mind, is the solution.

Introduction

The Marine Expeditionary Unit's (MEU) commitment to operations conducted during the first decade of the 21st Century has been significant. During this time, the MEU has executed Combat Operations in Iraq and Afghanistan, Non-Combatant Evacuation Operations in Lebanon, Humanitarian Assistance and Disaster Relief Operations in Haiti, Strike Operations in Libya, and a myriad of other missions that covered the entire Range of Military Operations (ROMO). In each case, the MEU reinforced its reputation as a flexible, forward-deployed formation capable of rapid response during a crisis. A cursory review of this recent history reveals no compelling reason to fundamentally alter the organization of the MEU. A more detailed analysis, however, reveals a need to fundamentally restructure the MEU.

A feeling that the assertion above is inflammatory and untrue is understandable considering the reputation of the MEU. If one removes the MEU from the equation and simply asks two basic questions, however, the validity of this assertion is revealed. If a unit was capable of executing only 54% of the tasks required by Higher Headquarters, would it be considered efficient? If a unit was not organized to counter the threat posed by the enemy, would it be allowed to deploy unchanged? The answer to both of these questions is clearly, no. If such a unit existed, the Marine Corps would consider it broken, and then fix it.

Amphibious Ready Groups and Marine Expeditionary Units (ARG/MEU), will only be capable of fulfilling 54% of Combatant Commander's requests in 2012 (Appendix 1). This surprising percentage is tied directly to an increased demand. "Since 2007, the combatant commands' operational demand for ARG/MEU's has increased by 86 percent and the demand for individually tasked amphibious ships has increased by 53 percent."[1] The combatant commanders' demand, particularly on the low-end of ROMO[2], has exceeded supply in the past

and will continue to do so in the future unless fundamental changes are made. The MEU must modify its organization in a way that enables it to execute an increased number of tasks on the low-end of ROMO.

The development of a MEU model that increases capacity on the low-end of ROMO must be balanced with capabilities that the MEU will need on the high-end of ROMO[3]. To understand what capabilities are needed, one must examine the 21st Century threat and evaluate its impact on MEU missions. This threat analysis has been done. All services agree that the character of amphibious warfare has changed as a result of this 21st Century threat. The Navy and Marine Corps have provided thoughts regarding the tactical impact of this change in a wide variety of documents. Currently, the MEU is not trained, manned, or equipped in a manner that maximizes its ability to operate against this 21st Century threat. It is possible that changes made to facilitate increased efficiency for the MEU on the low-end of ROMO could actually facilitate increased effectiveness on the high-end of ROMO.

Currently, the MEU is designed to operate as a single Marine Air-Ground Task Force (MAGTF), embarked aboard three amphibious ships. Once deployed, this MAGTF routinely disaggregates[4] and performs numerous tasks simultaneously. Disaggregation is the norm, and yet the MEU is not designed to do it. The single MAGTF model is an impediment to efficiency on the low-end of ROMO. On the high-end of ROMO, the threat has changed. An evaluation of this new threat, and the tactics required to counter it, reveals that disaggregation may be the key to success on the high-end of ROMO as well. The 21st Century MEU should be restructured. It should be manned, trained, and equipped to function as three separate MAGTF's embarked aboard three separate ships. This MEU should be designed for disaggregated operations on the

low-end of ROMO and leverage that design to execute distributed operations on the high-end of ROMO.

The 21st Century MEU – The Disaggregated Model Criteria

In order to validate this assertion, a picture must be painted. First, the operating environment and requirements on the low-end of ROMO must be identified. Second, a general model of the 21st Century MEU must be provided. Third, that model must support the assertion that the adoption of a restructured 21st Century MEU could increase capacity. Fourth, considerations associated with support required from the Amphibious Navy must be taken into account in order to validate that the assertion is supportable from an external perspective. In summary the restructured 21st Century MEU model:

(1) Must: Increase the MEU's capacity to execute missions on the low-end of the ROMO

(2) Must: Account for the design constraints associated with the Amphibious Fleet

(3) Must: Account for the financial constraints associated with the Amphibious Fleet

Once the initial assertion has been validated, the missions and threats that exist on the high-end of ROMO must be described. Following this description, evidence must be presented that a restructured 21st Century MEU may actually find itself better prepared to meet this threat and accomplish these missions as a result of the modifications made to facilitate efficiency on the low-end of ROMO.

Increasing Capacity – Considerations Regarding the Low-End of ROMO

A review of Marine Corps Order 3120.9C (Appendix 2), provides an overview of the fifteen Mission Essential Tasks (MET's) that the MEU is responsible for executing. A review of MEU missions executed over the past twenty years demonstrates that Theater Security

Cooperation and Humanitarian Assistance Operations have actually been the capabilities most often required by Geographic Combatant Commanders (Appendix 3). In fact, it is the capabilities that the MEU possesses on the lower end of ROMO that have been required the most. An analysis of the National Security Strategy (NSS), as well as associated Department of Defense (DOD) documents, reveals that the need for the MEU on the low-end of ROMO is likely to increase.

The NSS of 2010 describes a world in which "wars over ideology have given way to wars over religious, ethnic, and tribal identity; nuclear dangers have proliferated; inequality and economic instability have intensified; damage to our environment, food insecurity, and dangers to public health are increasingly shared."[5] According to assessments contained within the 2010 Quadrennial Defense Review (QDR), this global situation has created "a complex and uncertain security landscape in which the pace of change continues to accelerate."[6]

Between these two documents, a picture emerges of a world hindered by an increasing number of destabilizing influences. Each one of these destabilizing influences carries with it a potential, if left unchecked, to impact an increasingly interdependent world. Within the context of the National Security Strategy, checking these destabilizing influences will be done using a combination of all instruments of national power, and in concert with partner nations.

The military component of the National Security Strategy focuses specifically on the wide range of security threats that exist within this increasingly unstable world. Successful defense of the national interests of the United States, in light of these threats, relies on the ability of the DOD to accomplish four priority objectives outlined in the QDR: "prevail in today's wars, prevent and deter conflict, prepare to defeat adversaries and succeed in a wide range of contingencies, and preserve and enhance the All-Volunteer Force."[7]

Of particular interest to the Marine Corps in general, and the MEU specifically, is the degree to which the NSS and the QDR "emphasizes preventing, not just prevailing in conflicts."[8] This emphasis has translated into the following assumption articulated within the QDR: "in the future, as our forces transition into a period of less-intensive sustained operations, the Department's force planning assumes an ability to undertake a broader and deeper range of prevent-and-deter missions."[9] It is likely, given recent history and current foreign policy objectives, that prevent-and-deter operations will continue to be needed within the Middle East (Arab Spring), and that these requirements will grow within the Asia-Pacific Region.[10] Military operations within these areas, from a geographical perspective, will require the commitment of amphibious forces.

As the war in Afghanistan draws to a close, the Marine Corps' support for prevent-and-deter missions will once again become the main effort, and the MEU will lead the charge. The MEU is suited for this task. It is a "flexible, adaptable, and versatile military force that is ready and capable of being forward-deployed and forward engaged, building partnerships, and immediately responding to crises or contingencies"[11] While this description, contained within the 2010 Force Structure Review Group (FSRG) Report, was intended to frame the future of the Marine Corps as a whole, it effectively captures what the MEU is capable of doing right now.[12]

These inputs lead to only one logical output. In the future, demand for the MEU will increase. A logical assumption is that the decreasing global stability articulated within the NSS will cause an increased demand for the unique capabilities possessed by the MEU. The National Security Strategy, the Quadrennial Defense Review, the Marine Corps FSRG Report, and countless other supporting documents assert that the future operating environment will continue to be plagued by instability. The DOD strategy to counter the effects of this instability is likely to

translate into a sustained increase in demand for the MEU during the next decade. It is likely that this demand will exist on the low-end of ROMO with an emphasis on partnership, prevention, and deterrence.

In order to meet this increased demand on the low-end of ROMO, the MEU must embrace a concept first articulated in the Marine Corps Combat Development Command's White Paper titled *Amphibious Operations in the 21st Century*: "Individual naval platforms, forward deployed and globally distributed, must be capable of more diverse, smaller-scale amphibious missions while retaining the ability to re-aggregate for larger-scale events."[13]

A MEU, designed to realize this goal, would require the following modifications:

Maneuver	- **Shift from a <u>One</u> MAGTF Model to a <u>Three</u> MAGTF Model** - Each MAGTF, **independently**, capable of executing the following Mission Essential Tasks: <u>Theater Security Cooperation</u>, <u>Embassy Reinforcement</u> (Non-Combatant Evacuation Operations – First Responder), <u>Humanitarian Assistance / Disaster Relief</u> (First Responder) / <u>Maritime Interception Operations</u> / <u>Direct Action</u>, <u>Special Reconnaissance</u>, <u>Foreign Internal Defense</u> (Augmented by SOF) - Increase Reconnaissance assets in support of Maritime Interception Operations
Fire Support	- All MAGTF's augmented with Fire Support capability - Three Aviation Combat Elements (ACE) formed to support each MAGTF (Escort Aircraft)
Logistics	- **Ships within the ARG modified to embark and sustain a three MAGTF model** - Three Company-Sized Logistics Combat Elements (LCE) formed to support each MAGTF. These Combat Logistics Companies (CLC) would be mirror images of the Combat Logistics Battalion, but sized to support each MAGTF. - Each MAGTF augmented with a "Light Vehicle Set" to minimize logistical sustainment requirements while disaggregated in a permissive environment - Three Aviation Combat Elements (ACE) formed to support each MAGTF (Assault Support Aircraft)
Intelligence	- All MAGTF's augmented with Intelligence capability
Force Protection	- All MAGTF's manned and equipped to meet Force Protection requirements in both disaggregated and aggregated operations across the ROMO.

Command and Control	- Command Elements formed to support each MAGTF – Infantry Battalion Staff Model - Command Elements augmented by Marine Corps Security Cooperation Group Detachment to facilitate effective Theater Security Cooperation operations - Command Element augmented by Public Affairs Officer - Command Element augmented by Staff Judge Advocate - Command Element equipped with communications suite capable of supporting mission profiles outlined above
Information Operations	- Three IO Detachments formed to support each MAGTF

Figure 1

These modifications would result in a MEU fundamentally restructured for disaggregated operations. They create the potential for each one of the three MAGTF's, embarked aboard three separate ships, to execute five of fifteen Mission Essential Tasks (MET's) assigned to the MEU. Additionally, each MAGTF could serve as a first responder for Non-Combatant Evacuation Operations (NEO) and Humanitarian Assistance / Disaster Relief Operations (HA/DR). In total, these modifications could create a situation where a single ship, and its associated MAGTF, could respond to almost fifty-percent of the MEU's Mission Essential Task List (METL). Further experimentation may also prove that these individual MAGTF's may be capable of conducting Advance Force and Raid Operations as well.[14] In essence, these modifications create "individual naval platforms [that are] capable of more diverse, smaller-scale amphibious missions while retaining the ability to re-aggregate for larger-scale events."[15]

Individual MEU's seem to be headed in this direction already. In 2008, Colonel (Col) David Coffman, Commanding Officer of the 13th MEU, indicated that he was moving his Ground Combat Element's (GCE) Headquarters to the USS New Orleans.[16] In essence, by adding a Command Element to the Ground, Logistics, and Aviation Combat Elements already embarked aboard that ship, Colonel Coffman created a second MAGTF. The 13th MEU planned

for disaggregated operations. In an article published by the Marine Corps Gazette in 2011, Lieutenant Colonel (LtCol) Tye Wallace, the GCE Commander, articulated the numerous advantages and efficiencies gained by moving to this model. When Col Coffman created, in essence, a second MAGTF, he designed it with the goal of maximizing its ability to execute a wide variety of missions. LtCol Wallace's Detachment Alpha, as it was called, deployed with the capability to conduct Theater Security Cooperation, Humanitarian Assistance / Disaster Relief, Tactical Recovery of Aircraft and Personnel, Casualty Evacuation and Contingency Response operations. [17]

The modifications suggested in Figure 1 simply build on the changes made by the 13th MEU in 2008. Instead of two MAGTF's, there are three. Unlike the 13th MEU, however, the restructured 21st Century MEU depicted would not result from a reconfiguration of existing MEU assets. Instead, it would be manned, trained, and equipped, from the ground up, to support disaggregated operations while retaining the ability to aggregate and execute larger scale missions. The result of this effort is increased capacity (Appendix 4).

The Tough Question – Can the Amphibious Fleet Support?

The Amphibious Fleet is currently facing the same financial difficulties as the Marine Corps. According to the Congressional Budget Office (CBO), the Navy will have difficulty sustaining a 33 ship Amphibious Fleet over the next thirty years. "Under the 2012 plan, the Navy's inventory of amphibious ships would reach at least 33 ships for 15 of the next 30 years—between 2017 and 2031. The rest of the time, from 2012 to 2016 and from 2032 to 2041, the amphibious force would fall below that objective. Over the next 30 years, the force would never reach 38 ships."[18] The 2012 plan sustains a capability within the Navy to maintain between nine (2012-2016 / 2032-2041) and ten (2017-2031) deployed amphibious ships at a time.[19]

This CBO report paints a bleak picture. In an environment where the Navy is struggling to maintain the Amphibious Fleet, the ship modifications required to support a restructured 21st Century MEU are likely to be a low priority. If the required ship modifications were tied to efficiency and potential savings, however, the Navy might be willing to listen.

In fact, the Navy probably will listen because the modifications required to support the restructured 21st Century MEU could simultaneously increase their overall amphibious lift capacity and eliminate the requirement to invest in the development of a new class of amphibious ships.

The design modification required to support the restructured 21st Century MEU already exists (Appendix 5). The Landing Craft Air Cushion Lander, Launcher, and Lifter System (LCAC L4), designed by Frank Colangelo, was originally intended to leverage elevator technology to increase the overall embark capacity of the amphibious fleet. The design calls for an appendage to be added to the aft section of Landing Ships, Dock (LSD's) and Amphibious Transports, Dock (LPD's). The LCAC L4 System supports an elevator capable of lifting an LCAC from the waterline to the flight deck, where the LCAC would be staged for transport. This model creates a significant increase in the embark capacity of each ship through the conversion of previously unused well deck space and the addition of hangar space. When this system is installed on LPD-17's and LSD-49's, the restructured 21st Century MEU can be embarked. To illustrate this point, a 21st Century MEU model has been created and embarked using the Integrated Computerized Deployment System (ICODES) (Appendix 6, Appendix 7). From an amphibious ship design perspective, the restructured 21st Century MEU is possible.

Financial considerations must now be taken into account. LCAC L4 cost estimates range between $50M and $60M depending on the class of ship.[20] When compared to the cost of

increasing total embark space through new ship construction, the LCAC L4 System emerges as a clear winner. In the case of an LPD-17, the cost of new construction is, at a minimum, $1.7B.[21] In terms of vehicle embark space, this expenditure provides 25K square feet, at a cost of $68K per square foot.[22] The LCAC L4 System provides an additional 17.3K square feet on the LPD-17 at a cost of $3.4K dollars per square foot. To illustrate the point further, installing two LCAC L4 Systems on two LPD-17's would cost approximately $120M. This increase in vehicle lift capacity for the Amphibious Fleet (34.6K Square Feet) exceeds what the Navy could achieve by purchasing another $1.7B LPD-17.

These facts alone should be sufficient to spark the Navy's interest because the LCAC L4 System offers the Navy a low cost solution to a significant problem. Over the next thirty years, the Navy will struggle to maintain its requirement to embark two Marine Expeditionary Brigades (MEB) aboard ships of the Amphibious Fleet.[23] A review of the information provided in Appendix 4 illustrates that the Amphibious Fleet, if it were upgraded with the LCAC L4, would never fail to meet its requirement to lift two MEB's. In fact, the net increase in embark space provided by the LCAC L4 could actually increases the lift capacity to three MEB's. The LCAC L4 presents the Navy with a cost effective solution to the challenge of lifting the MEB and, from a MEU perspective, enables the deployment of a restructured 21st Century MEU.

There are two opportunities for the Navy to actually save money while transforming the Amphibious Fleet to support the 21st Century MEU. The first, and more conventional, opportunity comes from the replacement of the LSD. The replacement of aging LSD's within the Fleet is scheduled to begin in the "mid 2020's".[24] The Navy's shipbuilding plan currently calls for replacement of the older Whidbey Island Class LSD's first. The addition of the LCAC L4 System on the Whidbey Island Class of LSD would result in a significant gain in embarkation

capacity. The fact that these ships will begin to be decommissioned in approximately thirteen years, however, may prove any significant investment to be unwise.[25] Investment in the newer Harpers Ferry Class of LSD's makes more sense. These ships will serve in the fleet for another fifteen to twenty years. The gain in embarkation space on the Harpers Ferry Class of LSD, when modified with the LCAC L4, is less significant than the Whidbey Island Class, but this modification creates the potential to build a hanger. In short, the LCAC L4 gives the Whidbey Island Class LSD a more robust aviation capacity and makes the restructured 21st Century MEU model work, in the short term. A long term solution, however, will need to be found. It is within the long-term solution that potential savings exist. The Navy's current shipbuilding plan states that the aging LSD's within the Fleet will be replaced by the LSD(X). The design for this ship has not been decided.[26] If the Navy were to replace their LSD's with a modified version of the LPD-17 (LCAC L4), they could potentially save a significant amount of money. Using the LPD-17 design would keep that ships production line open, which would save money. Additionally, this course of action would leverage the LPD-17 production learning curve, which could save even more money.[27] This idea of using the LPD-17 design as a basis for the LSD(X) is not unrealistic. In fact, this idea is currently being considered by the Navy.[28]

The second opportunity for the Navy to save money while supporting the restructured 21st Century MEU would likely be more controversial. If the Navy were to cancel the production of one LPD-17 ($1.7B) over the next thirty years, it could use $1B to fund the attachment of twenty-two LCAC L4 Systems. This increases in the Amphibious Fleet's vehicle lift capacity would be equivalent to the construction of fourteen additional LPD-17's. It would also save the Navy $700M.

A counter-argument to the LCAC L4 System is that it is unproven technology. This is untrue. The Navy commissioned the SS Cape May (AKR-5063) in 1972. This ship, designed with elevator technology similar to that of the LCAC L4, is still in service today with Military Sealift Command.[29]

The evaluation criteria offered previously suggested that a 21st Century MEU must be supportable from an amphibious ship design perspective, as well as a financial perspective. The information provided in this section provides evidence that the Amphibious Fleet, with cost effective design modifications, could embark this fundamentally restructured MEU. Additionally, these design modification, in the long term, could actually save the Navy money.

The Emerging Threat – Considerations Regarding the High-End of ROMO

The Mission Essential Task List associated with the MEU requires its Marines and Sailors to be prepared for operations across the full spectrum of conflict. These operations range from Theater Security Cooperation in a permissive environment to an Amphibious Assault in a hostile environment.[30] Consideration of the most significant threat that could be faced by the MEU is required in order to inform the restructuring process. In the future, the MEU may be tasked with conducting an Amphibious Assault, Amphibious Raid, Port / Airfield Seizure, or Advance Force Operations in support of a Marine Expeditionary Brigade (MEB). It is likely, given the significant increase in population within coastal regions, that these operations will be conducted in a populated / urban area. According to numerous military theorists, it is likely that the MEU would face a "Hybrid Threat"[31] within these urban areas.

In 2007, The Potomac Institute for Policy Studies published a paper written by LtCol Frank Hoffman, USMC (Ret) titled, *Conflict in the 21st Century: The Rise of Hybrid Wars.* In this paper LtCol Hoffman defines the hybrid threat as follows: "Threats that incorporate a full

range of different modes of warfare including conventional capabilities, irregular tactics and formations, terrorist acts including indiscriminate violence and coercion, and criminal disorder, conducted by both states and a variety of non-state actors."[32]

In order to understand the type of formation that must be created in order to defeat a hybrid threat, one must refine Hoffman's definition into a workable model. A reasonable starting point for such a model is the Israel-Hamas-Hezbollah Conflict of 2006. An examination of this conflict reveals a likely Course of Action that may be employed by an urban-based hybrid threat to counter amphibious power projection.

First, the conflict itself occurred within heavily populated urban areas. This complex terrain afforded Hamas and Hezbollah the opportunity to minimize the technological advantage held by the Israelis. By concealing themselves within the civilian population, Hamas and Hezbollah were able to significantly reduce the Israelis' ability to effectively engage their forces. Even with Israel's deployment of a significant number of collections assets, Hezbollah and Hamas were difficult to locate. The Israelis' targeting efforts were further frustrated by the fact that both Hamas and Hezbollah employed small, highly mobile formations. These formations would emerge from a concealed position, engage, and withdraw before the full force of Israeli combined arms could be brought to bear. These formations would then resupply using numerous caches throughout the city, only to emerge once again on the Israelis' flank, or in the rear.[33]

These tactics by themselves are nothing new. It is how one would expect a smaller and less capable force to operate when facing a technologically and numerically superior force. Hezbollah, however, augmented these tactics with enablers such as rockets, Precision-Guided-Munitions (PGM's) and Unmanned Ariel Vehicles (UAV's). By leveraging technology provided by sympathetic and technologically advanced nations, Hezbollah was able to engage Israeli

population centers, tanks, aircraft, and ships. Each one of these weapons systems was employed by Hezbollah in the same distributed and highly-mobile fashion as their infantry units.[34] The final challenge presented by Hezbollah and Hamas came in the form of propaganda. Their ability to paint the Israeli Defense Forces as bullies, indiscriminately destroying buildings and killing innocent civilians, served to reinforce the will of their own population and call the legitimacy of the Israelis' war effort into question.[35]

A study of the Israel-Hamas-Hezbollah Conflict of 2006 only begins to paint a picture of the hybrid threat. Hezbollah's forces operated almost exclusively on the irregular side of the hybrid spectrum. There are numerous countries, such as Iran, that have the capability to combine irregular forces and tactics with a robust conventional force. It is likely, even given the presence of these conventional forces on the battlefield, that possible threat actors, such as Iran, will distribute and conceal both conventional and irregular forces across the urban battlefield in an effort to offset American technological superiority.

In a recent paper published by the Australian Land Warfare Centre title *Distributed Manoeuvre: 21st Century Offensive Tactics,*[36] Justin Kelly and Mike Brennan suggest that tactics similar to those used by Hezbollah will be used with increasing frequency in the future. This "Distributed Defense" will create "a situation in which the defensive line [will] dilate into a defensive zone through which combat elements are distributed in force packages small enough to exploit terrain in order to hide themselves from the scrutiny of stand-off surveillance."[37]

Kelly and Brennan continue by asserting that "conventional tactics have tended to deal with this problem through mass—creating a force of sufficient robustness for it to survive the process of empirical learning while retaining its functionality."[38] This conventional force might look strikingly similar to the one employed during OPERATION AL-FAJR.[39] While this

operation was successful, one should ask how the operation might have progressed if the same number of soldiers and Marines executed a similar operation within a city three times the size, whose population had not evacuated, and against an enemy armed and employed like Hezbollah. It is probable that this force, if it employed similar tactics, would have sought to clear and hold sections of the urban terrain in a successive fashion until all sections were secured. The lead elements of each combat formation would have likely been heavy, in order to facilitate survival during the initial moments after strongpoints were uncovered. Once these strongpoints were uncovered, additional assets would mass in order to reduce the threat before moving forward.

This tactic is flawed. The employment of a larger, mechanized / armored lead element slows the pace and increases the signature of the formation. This, in turn, creates an opportunity for the distributed "hybrid threat" to function in accordance with its design. A lumbering force moving along multiple axes of advance presents lucrative targets to be engaged only when the enemy believes he has the advantage.

Kelly and Brennan conclude their work by suggesting an alternate model to counter this "distributed defense." In their model, the initial assault in a distributed environment would be executed by a large number of small groups (Figure 2).

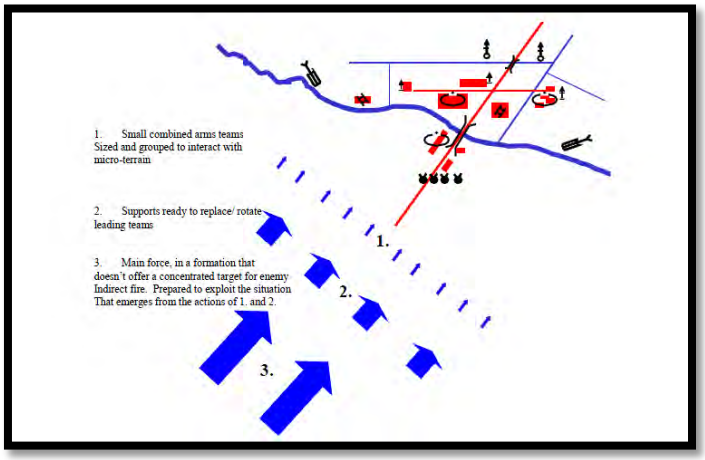

Figure 2

Each task-organized group would act as a sensor, seeking to uncover the concealed strong-points within the battlespace. Once uncovered, the small formations, or potentially larger formations following behind, mass on the strong-point and reduce it. This process is to be repeated until the mission has been accomplished. [40]

This model carries with it the potential to place the enemy in a dilemma. By retaining speed and stealth, the "distributed offense" creates an untenable situation for the defender. His situational awareness is degraded because the lead elements of the offense have a reduced their signature. If he seeks to displace in order to locate his target, he risks meeting them on ground of their choosing. If he is engaged within his strongpoint, he can look forward to the enemy reinforcing quickly and isolating him from reinforcement.

This picture of the hybrid threat on a tactical level, and how to counter it, has implications for the MEU. In the context of Joint Amphibious Forcible Entry, the MEU continues to be considered a likely candidate for Advance Force Operations.[41] The MEU's constant forward presence virtually assures that it would be the first amphibious formation in position to affect the Joint Force Commander's (JFC) battlespace. Initially, the MEU would likely be tasked with Strike Operations, Special Reconnaissance, Direct Action, and Raids designed to support a robust joint effort to disrupt the enemy's Anti-Access / Area Denial (A2AD) capability.[42] It is likely that these operations would be executed from well Over-the-Horizon (OTH), and over the course of weeks. These actions are designed to set conditions for the closure of the Amphibious Force, and an Amphibious Assault.[43] Execution of an Amphibious Assault is on the MEU's Mission Essential Task List.

The 21st Century Amphibious Assault will be dramatically different from those executed in World War II, Korea, and Vietnam.[44] The initial goal of securing a lodgment to facilitate the

introduction of additional forces will remain the same, the tactics and techniques employed to achieve that goal will change. As mentioned, the Joint Task Force will leverage significant resources over the course of weeks to degrade the enemy's A2AD capability. This effort will be designed to facilitate the Fleet's entrance into the theater and ultimate closure to a position that is Over-the-Horizon from the Landing Beach.[45] As the Fleet closes on that position, the Advance Force will be required to suppress / disrupt remaining A2AD assets inside a beachhead[46] that, based off the capability of modern anti-ship and anti-air missile systems, could easily exceed twenty miles in width.[47] These remaining assets, previously undetected by the Joint Task Force, will likely be concealed within a distributed defense in an urban environment. The employment of these assets as the Amphibious Force moves into the Sea Echelon Area (SEA),[48] or after the Ship-to-Shore Movement (STS)[49] has begun, could be catastrophic. These remaining assets must be either located and neutralized, or disrupted in order to protect the Amphibious Fleet during the STS Movement process.

In order to accomplish this mission, the MEU will be required to insert and sustain its maneuver elements from well Over-the-Horizon. These maneuver elements, based off the potential size of the beachhead, could be separated by miles (Appendix 8).

The MEU has the force structure, in general, but it is not currently organized, trained, manned, or equipped to execute this mission.[50] A 21st Century MEU, restructured to support missions on the low-end of ROMO, might actually be better prepared to counter this threat. It is probable that the MEU would re-aggregate in order to execute an amphibious assault. Aggregation, however, does not mean that the MEU will employ its Ground Combat Element in a single area. All indications about the future operating environment suggest that the MEU will

execute a distributed offense in multiple urban areas, separated by miles, at the same time. Success in this endeavor will be tied, in every way, to successful MEB's landing operations.

Even when the MEU is aggregated, it will be required to execute distributed operations, from the start. The baseline changes made to the MEU to facilitate efficiency on the low-end of ROMO actually support these operations. The creation of three Command Elements, three Logistics Combat Elements, and three Ground Combat Elements, in simple terms, works.[51] If the MEU, as it is currently organized, were tasked with the execution of an amphibious assault similar to the example provided, they would likely organize themselves in a manner that is similar to the restructured 21st Century MEU.

If the current MEU were to attempt this reorganization today, they would likely find shortfalls in several key areas:

Maneuver	- The Ground Combat Element would need to be trained, manned, and equipped to execute a distributed offense designed to neutralize or disrupt A2AD assets employed by irregular and conventional forces, within an urban beachhead.
Fire Support	- The MEU would need an increased precision fire capability to support light and distributed lead elements during the initial contact with concealed strong-points within the distributed defense.
Logistics	- The MEU would need to restructure its single Logistics Combat Element in a manner that facilitates rapid support for widely distributed units. It is likely that they would face resource shortfalls in this area. - The MEU would likely face significant difficulty conducting OTH Ship-to-Shore movement and sustainment.
Intelligence	- The MEU would likely have difficulty collecting and analyzing intelligence in a timely fashion in order to support disaggregated maneuver elements. This difficulty would be tied to a lack of assets (Radio Battalion, Intelligence Analysts)
Force Protection	- The MEU would face survivability challenges because, as they are currently equipped, they may lack support from Amphibious Assault Vehicles for the initial phases of the assault.
Command and Control	- The MEU would likely have difficulty maintaining effective Command and Control support to company-level in a distributed environment. While the actual communications capacity may suffice, deconfliction of fires and Information Operations (Specifically Military Information Support Operations and Electronic Warfare) may prove challenging.

Figure 3

The potential shortfalls listed above in Logistics, Intelligence, Command and Control and Maneuver are, in large part, addressed by the restructured 21st Century MEU. The remainder of the issues would require technological solutions.

An example of how a restructured 21st Century MEU might approach these technological solutions has been provided (Appendix 4). At best, this is a starting point and provided only for consideration. A cursory review of this model, however, reveals numerous fundamental shifts. First, Amphibious Assault Vehicles have been replaced with M113's (Appendix 9). These vehicles can be inserted from well Over-the-Horizon via Landing Craft or CH-53K's. 60mm and 81mm Mortar Sections have been augmented with Switchblade UAV's. These UAV's can be employed for reconnaissance as well as precision fire (Appendix 10). Up-Armored High-Mobility Multi-Wheeled Vehicles (HMMWV) have been replaced with Oshkosh Sandcats. These vehicles are light, considering the Improvised Explosive Device (IED) protection they provide. The Sandcat also carries more Marines than a HMMWV. This factor allows the restructured 21st Century MEU to maintain mobility while keeping overall weight at a manageable level (Appendix 11).

This model is simply intended to communicate a point. A restructured 21st Century MEU, designed for the low-end of ROMO, and augmented with personnel and equipment to counter a 21st Century threat, could actually support amphibious operations on the high-end of ROMO more effectively.

Additional Possibilities

No discussion of the future MEU would be complete without mentioning the friction points associated with the new America Class LHA(R) (Appendix 12). This platform, scheduled to arrive in the Amphibious Fleet towards the end of this decade, will not have a well deck. This

reduction in embark space is an issue of significant concern for the MEU. The restructured 21st Century MEU might provide a solution to this problem as well. The 21st Century MEU, when deployed aboard an America Class LHA(R), would simply embark the personnel and equipment associated with its LCE and GCE, that it no longer has room for, aboard an independently deploying amphibious ship. If conditions for aggregating the MEU were met, they would be joined by this independently deployed and independently tasked amphibious ship that carried the remainder of their personnel and equipment. While this MEU would deploy much lighter, its aggregated combat power would actually exceed what could be fielded by a traditional, three ship, ARG/MEU.

Conclusion

The number of tasks the MEU will receive on the low-end of ROMO will only increase in the coming years. The threats that the MEU faces on the high-end of ROMO today are vastly different than the threats faced by amphibious forces in the past. This evolution of the threat will require the entire Amphibious Force to modify its tactics and, in some cases, its organization and equipment. The MEU must consider the implications of both of these factors as it works to determine the right force structure for the future. The criteria initially established to validate the potential efficiency and effectiveness of a restructured 21st Century MEU have been met. As such, this model warrants additional research and consideration. A MEU comprised of three MAGTF's is not doctrinal, but it is the answer.

[1] Hanifen, Harris, Holzer, "Trouble Busters." *Armed Forces Journal*, August, 2011, 1, http://www.armedforcesjournal.com/2011/08/6486806/ (Accessed March 05, 2012)
[2] Authors Note: There exists no doctrinal definition for "the low-end of ROMO". Within this paper, missions that fall on the low-end of ROMO include: Theater Security Cooperation and Humanitarian Assistance. Noncombatant Evacuation Operations, Tactical Recovery of Aircraft and Personnel, Maritime Interception Operations and Stability Operations, if the threat to U.S. Forces is deemed minimal, may also fall on the low-end of ROMO. These missions are defined in Appendix 2.
[3] Authors Note: There exists no doctrinal definition for "the high-end of ROMO". Within this paper, missions that fall on the high-end of ROMO include: Amphibious Assault, Amphibious Raid, Port / Airfield Seizure, and Advance Force Operations. These missions are defined in Appendix 2.
[4] Authors Note: There exists no doctrinal definition of "disaggregated operations". Within this paper, disaggregated operations refer to a state wherein individual ships within the Amphibious Ready Group, and the Marines embarked aboard those ships, are widely dispersed. This dispersion results in an inability for these ships to mutually support one another on the tactical level. In practice, the Marines and Sailors embarked aboard these ships are dispersed to accomplish different tasks. "Aggregation" refers to a state wherein the individual ships within the ARG, and the Marines embarked aboard these ships, are geographically co-located and capable of tactical level mutual support. In practice, Marines and Sailors embarked aboard these ships are co-located to accomplish one task.
[5] Ibid, 1
[6] U.S. Department of Defense, Office of the Undersecretary of Defense, *Quadrennial Defense Review*, (Washington, D.C.: U.S. Department of Defense, 2010), iii http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf (accessed January 6, 2012)
[7] Ibid, v-vi
[8] Center for Strategic and International Studies. Tough Choices, by Martin Leed and Benjamin Moody. Washington D.C., 2011, vii http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf (accessed November 20, 2011)
[9] U.S. Department of Defense, Office of the Undersecretary of Defense, *Quadrennial Defense Review*, (Washington, D.C.: U.S. Department of Defense, 2010), vi http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf (accessed January 6, 2012)
[10] David Alexander, *New military strategy looks beyond Afghan War*, Reuters, 2011. http://www.reuters.com/article/2011/02/09/us-usa-military-strategy-idUSTRE71803H20110209 (accessed 23 April, 2012)
[11] Headquarters, United States Marine Corps. *Reshaping America's Expeditionary Force in Readiness*. Washington DC: Headquarters Marine Corps, 2011, 1, http://www.marines.mil/unit/hqmc/cmc/Documents/FSR_Final_14Mar11_ExecSum.PDF (accessed January 10, 2012)
[12] Headquarters, United States Marine Corps. *MCO 3120.9C*. Washington DC: Headquarters Marine Corps, 2011), 4, http://www.marines.mil/news/publications/Documents/MCO%203120.9C.pdf (accessed January 12, 2012)

[13] Headquarters, United States Marine Corps. *Amphibious Operations in the 21st Century*. Washington DC: Headquarters Marine Corps, 2009), 3, http://www.quantico.usmc.mil/MCBQ%20PAO%20Press%20Releases/090430%20CDI%20Docs/CDI_AmphibOps21stCent.pdf (accessed January 12, 2012)
[14] Department of Defense Bloggers Roundtable, *The Mission of the Boxer Expeditionary Strike Group and the 13th Marine Expeditionary Unit*, 12 Nov, 2008, http://www.defense.gov/dodcmsshare/BloggerAssets/200811/11140811030920081112_CaptDallman_transcript.pdf (accessed March 25, 2012)
[15] Headquarters, United States Marine Corps. *Amphibious Operations in the 21st Century*. Washington DC: Headquarters Marine Corps, 2009), 3, http://www.quantico.usmc.mil/MCBQ%20PAO%20Press%20Releases/090430%20CDI%20Docs/CDI_AmphibOps21stCent.pdf (accessed January 12, 2012)
[16] Department of Defense Bloggers Roundtable, *The Mission of the Boxer Expeditionary Strike Group and the 13th Marine Expeditionary Unit*, 12 Nov, 2008, http://www.defense.gov/dodcmsshare/BloggerAssets/200811/11140811030920081112_CaptDallman_transcript.pdf (accessed March 25, 2012)
[17] Tye Wallace, "The 21st Century MEU." *Marine Corps Gazette*, February 2011, 70-79, http://www.marinecorpsgazette-digital.com/marinecorpsgazette/201102?pg=4#pg75 (accessed April 2, 2012)
[18] Congressional Budget Office. *An Analysis of the Navy's Amphibious Warfare Ships for Deploying Marines Overseas* , November, 2011, 2, http://cbo.gov/ftpdocs/124xx/doc12481/11-18-AmphibiousShips.pdf (accessed January, 20, 2012)
[19] Ibid, 2
[20] V. Frank Colangelo, Edward J. Downey, "The L4 LCAC System: Prospects for 3.0 MEB AEs in the Age of Sea Basing 21", *The Naval Engineering Journal*, January, 2010, 134, https://www.navalengineers.org/SiteCollectionDocuments/hamilton_award_papers/122_4/paper8.pdf (accessed January 2, 2012)
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[22] Headquarters, United States Marine Corps, MCRP 3-31B, *Amphibious Ships and Landing Craft Data Book*, Washington DC: Headquarters Marine Corps, (2001), 13
[23] Congressional Budget Office. *An Analysis of the Navy's Amphibious Warfare Ships for Deploying Marines Overseas* , November, 2011, 2, http://cbo.gov/ftpdocs/124xx/doc12481/11-18-AmphibiousShips.pdf (accessed January, 20, 2012)
[24] Ronald O'Rourke, Navy LPD-17 *Amphibious Ship Procurement: Background, Issues, and Options for Congress* (Congressional Research Office, March, 2011) 1 http://www.fas.org/sgp/crs/weapons/RL34476.pdf (accessed March 15, 2012)
[25] Congressional Budget Office. *An Analysis of the Navy's Amphibious Warfare Ships for Deploying Marines Overseas* , November, 2011, 16, http://cbo.gov/ftpdocs/124xx/doc12481/11-18-AmphibiousShips.pdf (accessed January, 20, 2012)
[26] Ibid, 5
[27] Ronald O'Rourke, Navy LPD-17 *Amphibious Ship Procurement: Background, Issues, and Options for Congress* (Congressional Research Office, March, 2011) 5 http://www.fas.org/sgp/crs/weapons/RL34476.pdf (accessed March 15, 2012)
[28] Ibid, 5

[29] Navy Source Online, SS Cape May (AKR-5063) http://www.navsource.org/archives/09/54/545063.htm, (accessed Apr 26, 2012)
[30] Commandant of the Marine Corps. *Policy for Marine Expeditionary Units (MEU) and Marine Expeditionary Units (Special Operations Capable) MEU(SOC)*. MCO 3120.9C, August 4, 2009. 5-7 http://www.marines.mil/news/publications/Documents/MCO%203120.9C.pdf (accessed March 15, 2012)
[31] Lt. Col. Frank G. Hoffman, U.S. Marine Corps Reserve (Ret.), *Conflict in the 21st Century: The Rise of Hybrid Wars* (Arlington, Va.: Potomac Institute for Policy Studies, 2007), 7, http://www.potomacinstitute.org/images/stories/publications/potomac_hybridwar_0108.pdf (accessed January 15, 2012)
[32] Lt. Col. Frank G. Hoffman, U.S. Marine Corps Reserve (Ret.), *Conflict in the 21st Century: The Rise of Hybrid Wars* (Arlington, Va.: Potomac Institute for Policy Studies, 2007), 8, http://www.potomacinstitute.org/images/stories/publications/potomac_hybridwar_0108.pdf (accessed January 15, 2012)
[33] Anthony Cordesman, *Preliminary "Lessons" of the Israeli-Hezbollah War* (Center for Strategic and International Studies, 2006), 3-32 http://www.mafhoum.com/press9/286P6.pdf (accessed Feb 19, 2012)
[34] Ibid, 3-32
[35] Marvin Kalb, *The Israeli-Hezbollah War of 2006: The Media as a Weapon in Asymmetrical Conflict* (Harvard University, John F. Kennedy School of Government, Faculty Research Working Papers Series, 2007), http://www.brookings.edu/~/media/Files/events/2007/0217islamic%20world/2007islamforum_israel%20hezb%20war.pdf (accessed Feb 19, 2012)
[36] Author's Note: The term "distributed operations / maneuver" is used multiple times throughout this paper. While this term is not yet doctrinal, within this paper, it is meant to convey a unit capability. A unit capable of conducting distributed operations / maneuver has the ability to widely disperse small units across any given Area of Operations. In a practice, these units may not be capable of providing immediate tactical-level mutual support to one another, but they are working together to accomplish a common mission.
[37] Kelly, Justin, *Distributed Manoeuvre: 21st Century Offensive Tactics* (Land Warfare Studies Centre (Australia), 2009), 23, http://www.army.gov.au/lwsc/docs/wp134.pdf (accessed Jan 15, 2012)
[38] Ibid, 30
[39] Matt Matthews, *Operation AL FAJR: A Study in Army and Marine Corps Joint Operations* (Combat Studies Institute Press, Fort Leavenworth, Kansas), P 44, http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA454930 (accessed 24 Apr, 2012)
[40] Ibid, 31,
[41] Commandant of the Marine Corps. *Policy for Marine Expeditionary Units (MEU) and Marine Expeditionary Units (Special Operations Capable) MEU(SOC)*. MCO 3120.9C, August 4, 2009. 6 http://www.marines.mil/news/publications/Documents/MCO%203120.9C.pdf (accessed March 15, 2012)
[42] Anti-access strategies seek to prevent U.S. force entry into a theater of operations, while area-denial operations encompass actions to prevent joint-force freedom of action within the more narrow confines of an area under an enemy's direct control within their defended battlespace."

Andrew Krepinevich, Barry Watts and Robert Work, *Meeting the Anti-Access and Area Denial Challenge*, Washington, DC: Center for Strategic and Budgetary Assessment, 2003, p. 5.

[43] R. Work and Lieutenant Colonel F. Hoffman, USMCR(Retired), *Hitting the Beach in the 21st Century*, Proceedings Magazine, Nov, 2010 http://www.usni.org/magazines/proceedings/2010-11/hitting-beach-21st-century#footnotes (accessed Mar 1, 2012)

[44] Authors Note: Amphibious operations received little attention during the Vietnam War, but they did occur. OPERATION DOUBLE EAGLE was an amphibious assault that occurred in the Chu Lai District of Vietnam in 1966. OPERATION DECKHOUSE FIVE was one of a series of amphibious operations conducted by 7th Fleet and the Marines' Special Landing Force (SLF) along the Mekong River Delta in 1967.

[45] R. Work and Lieutenant Colonel F. Hoffman, USMCR(Retired), *Hitting the Beach in the 21st Century*, Proceedings Magazine, Nov, 2010 http://www.usni.org/magazines/proceedings/2010-11/hitting-beach-21st-century#footnotes (accessed Mar 1, 2012)

[46] "Beachhead. A designated area on a hostile or potentially hostile shore that, when seized and held, ensures the continuous landing of troops and materiel, and provides maneuver space requisite for subsequent projected operations ashore." JP 3-02, *Amphibious Operations*, 2009, p. GL-11

[47] R. Work and Lieutenant Colonel F. Hoffman, USMCR(Retired), *Hitting the Beach in the 21st Century*, Proceedings Magazine, Nov, 2010 http://www.usni.org/magazines/proceedings/2010-11/hitting-beach-21st-century#footnotes (accessed Mar 1, 2012)

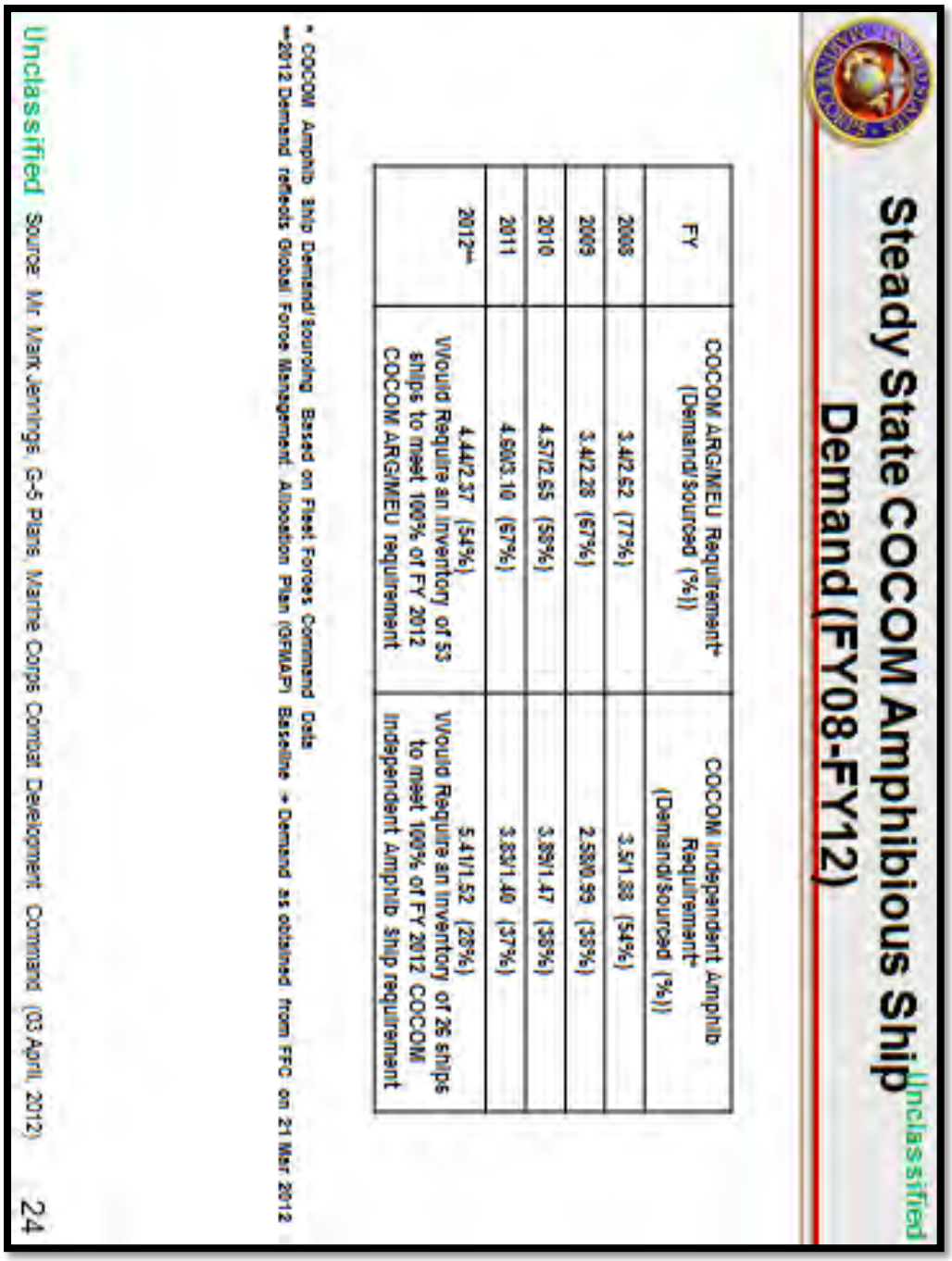
[48] "Sea Echelon Area. In amphibious operations, an area to seaward of a transport area from which assault shipping is phased into the transport area, and to which assault shipping withdraws from the transport area." JP 3-02, *Amphibious Operations*, 2009, p. GL-23

[49] Ship-to-Shore Movement. That portion of the action phase of an amphibious operation which includes the deployment of the landing force from the assault shipping to designated landing areas. JP 3-02, *Amphibious Operations*, 2009, p. GL-24

[50] The author served as an instructor at Expeditionary Warfare Training Group, Atlantic from 2008 to 2011. During this time, he witnessed the Predeployment Training Program (PTP) executed by the 22nd, 24th, and 26th MEU. In each case, the Amphibious Assault training that occurred was not conducted from Over-the-Horizon. Furthermore, the threat did not resemble the hybrid threat described within this paper.

[51] Authors Note: The Aviation Combat Element would likely be employed as one element when aggregated, not three.

Appendix 1 - Combatant Commander Demand for ARG/MEU[1]



Steady State COCOM Amphibious Ship Demand (FY08-FY12)

Unclassified

FY	COCOM ARG/MEU Requirement* (Demand/Sourced (%))	COCOM Independent Amphib Requirement* (Demand/Sourced (%))
2008	3.4/2.62 (77%)	3.5/1.88 (54%)
2009	3.4/2.28 (67%)	2.58/0.99 (38%)
2010	4.57/2.65 (58%)	3.85/1.47 (38%)
2011	4.6/3.10 (67%)	3.83/1.40 (37%)
2012**	4.44/2.37 (54%) Would Require an Inventory of 53 ships to meet 100% of FY 2012 COCOM ARG/MEU requirement	5.41/1.52 (28%) Would Require an Inventory of 26 ships to meet 100% of FY 2012 COCOM Independent Amphib Ship requirement

* COCOM Amphib Ship Demand/Sourcing Based on Fleet Forces Command Data
**2012 Demand reflects Global Force Management Allocation Plan (GFMAP) Baseline + Demand as obtained from FFC on 21 Mar 2012

Unclassified Source: Mr Mark Jennings, G-5 Plans, Marine Corps Combat Development Command (03 April, 2012) 24

[1] Mr. Mark Jennings, G5 Plans, Marine Corps Combat Development Command, e-mail message to the author, April 2012

Appendix 2 - MEU Mission Essential Task List[2]

Conduct Amphibious Assault: The principle type of amphibious operation that involves establishing a force on a hostile or potentially hostile shore.
Conduct Amphibious Raid: To conduct short-duration, small-scale deliberate attacks, from the sea, involving a swift penetration of hostile or denied battlespace.
Conduct Maritime Interception Operations: Visit, Board, Search and Seizure (VBSS), seizure of a static maritime platform and selected maritime security missions.
Conduct Advance Force Operations: Shape the battlespace in preparation for the main assault.
Conduct Noncombatant Evacuation Operations: Operations directed by the Department of State whereby noncombatants are evacuated from foreign countries to safe havens or to the U.S.
Conduct Humanitarian Assistance: Assistance to relieve or reduce the result of natural or man-made disasters.
Conduct Stability Operations: Stability operations are conducted to help establish order that advances U.S. interests and values.
Conduct Tactical Recovery of Aircraft and Personnel: This includes rescue or extraction, by surface or air, of downed aircraft and/or personnel and equipment.
Conduct Joint and Combined Operations: To conduct joint force organization and joint coalition operations.
Conduct Aviation Operations from expeditionary shore-based sites: Operate from amphibious shipping, forward operating bases, Expeditionary Airfields, Forward Arming and Refueling Points, austere forward operating sites, tactical landing zones, etc.
Conduct / Support Theater Security Cooperation: Combined and multinational military non-combat activities conducted with other nations within the theater in order to create favorable military geographical balances of power.
Conduct Airfield / Port Seizure: Secure and airfield, port or other key facilities in order to support MAGTF missions.
Conduct Direct Action Operations: (Associated with MARSOF) – Short duration strikes and other small-scale offensive actions conducted as special operations in hostile, denied, or politically sensitive environments.
Conduct Special Reconnaissance: (Associated with MARSOF) – Reconnaissance and surveillance actions conducted as special operations in hostile, denied, or politically sensitive environments to collect or verify information of strategic or operational significance.
Conduct Foreign Internal Defense: (Associated with MARSOF) – Participation by civilian and military agencies of a government in any of the action programs taken by another government or other designated organization to free and protect its society from subversion.

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[2] Headquarters, United States Marine Corps. *MCO 3120.9C*. Washington DC: Headquarters Marine Corps, 2011), 4, http://www.marines.mil/news/publications/Documents/MCO%203120.9C.pdf (accessed January 12, 2012)

Appendix 3 - MEU (SOC) Operations: 1990-2009[3]

MEU(SOC) Mission Essential Task List	
Mission Type	Execution from 1990-2009
Amphibious Assault	1
Amphibious Raid	2
Maritime Interception Operations	7*
Advance Force Operations	0
Non-Combatant Evacuation Operations	6
Humanitarian Assistance Operations	18
Stability Operations	11
Tactical Recovery of Aircraft and Personnel	3
Joint and Coalition Operations	No Data Available**
Aviation Operations from Shore Based Sites	No Data Available
Theater Security Cooperation	158 (2006-2010 Only)***
Airfield and Port Seizure	4
Direct Action Operations	No Data Available
Special Reconnaissance	No Data Available
Foreign Internal Defense	No Data Available
MEU(SOC) Non-Mission Essential Task List	
Amphibious Withdraw	1
Deterrence Operations / Show of Force	10
Demonstration	1
Assurance Operations (Security Presence)	1
No-Fly-Zone Enforcement	7
Strike Operations	18
Embassy Reinforcement or Evacuation	11

* This number reflects only MIO operations conducted in support of named operations

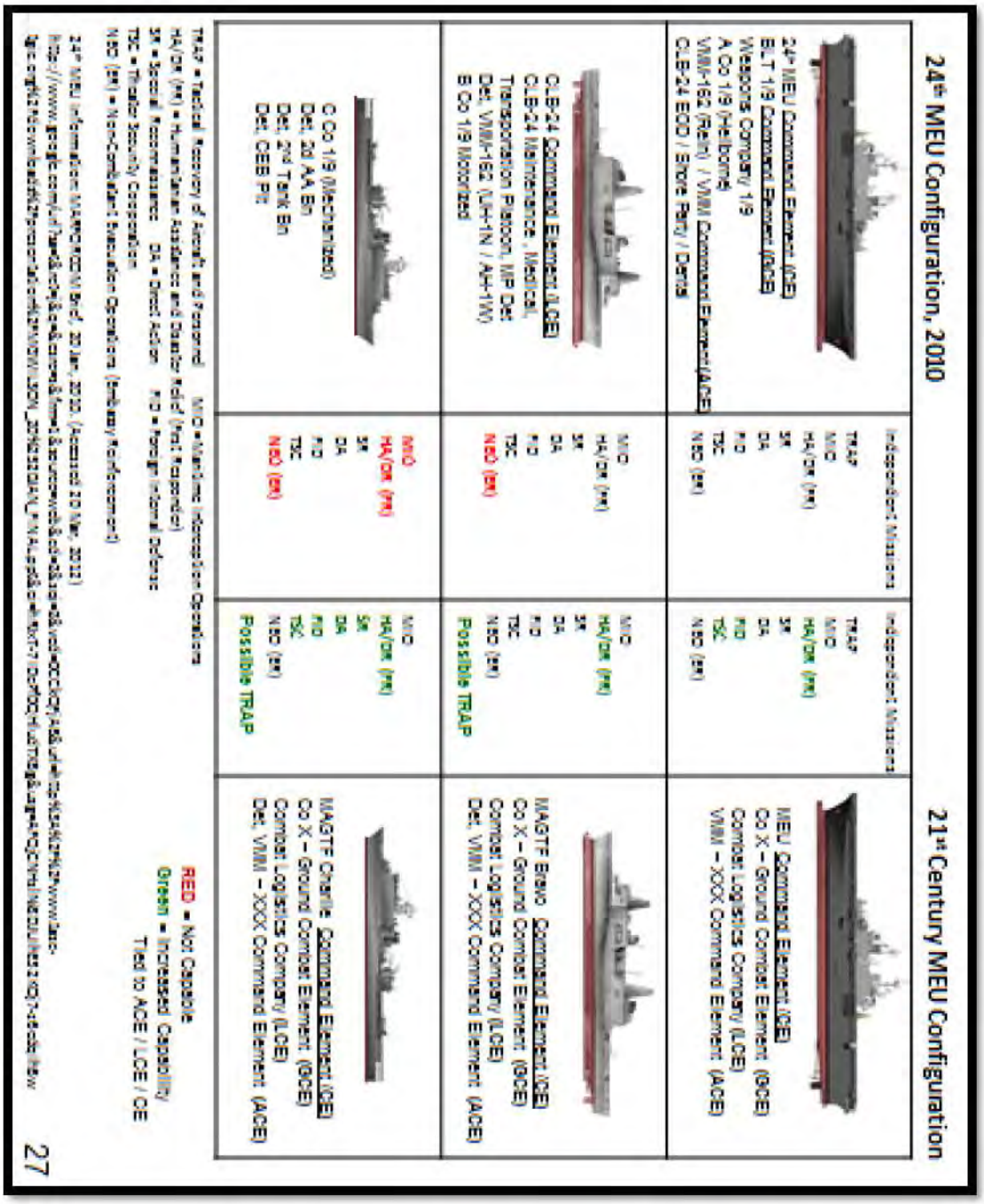
** All MEU (SOC)'s deployed in this period were capable of executing Joint and Combined Operations

*** The Center for Strategic and International Studies has compiled data on execution of this mission only from 2006 to 2010. This data reflects only TSC executed from amphibious platforms in the Middle-East, Africa, Asia-Pacific, Europe, and Central / South America.[4]

[3] U.S. Naval Institute, *"Amphibious Operations 1990-1999", "Amphibious Operations 2000-2009"* http://blog.usni.org/2009/05/25/amphibious-operations-1990-1999/ http://blog.usni.org/2009/05/25/amphibious-operations-2000-2009/ (accessed January 15, 2012)

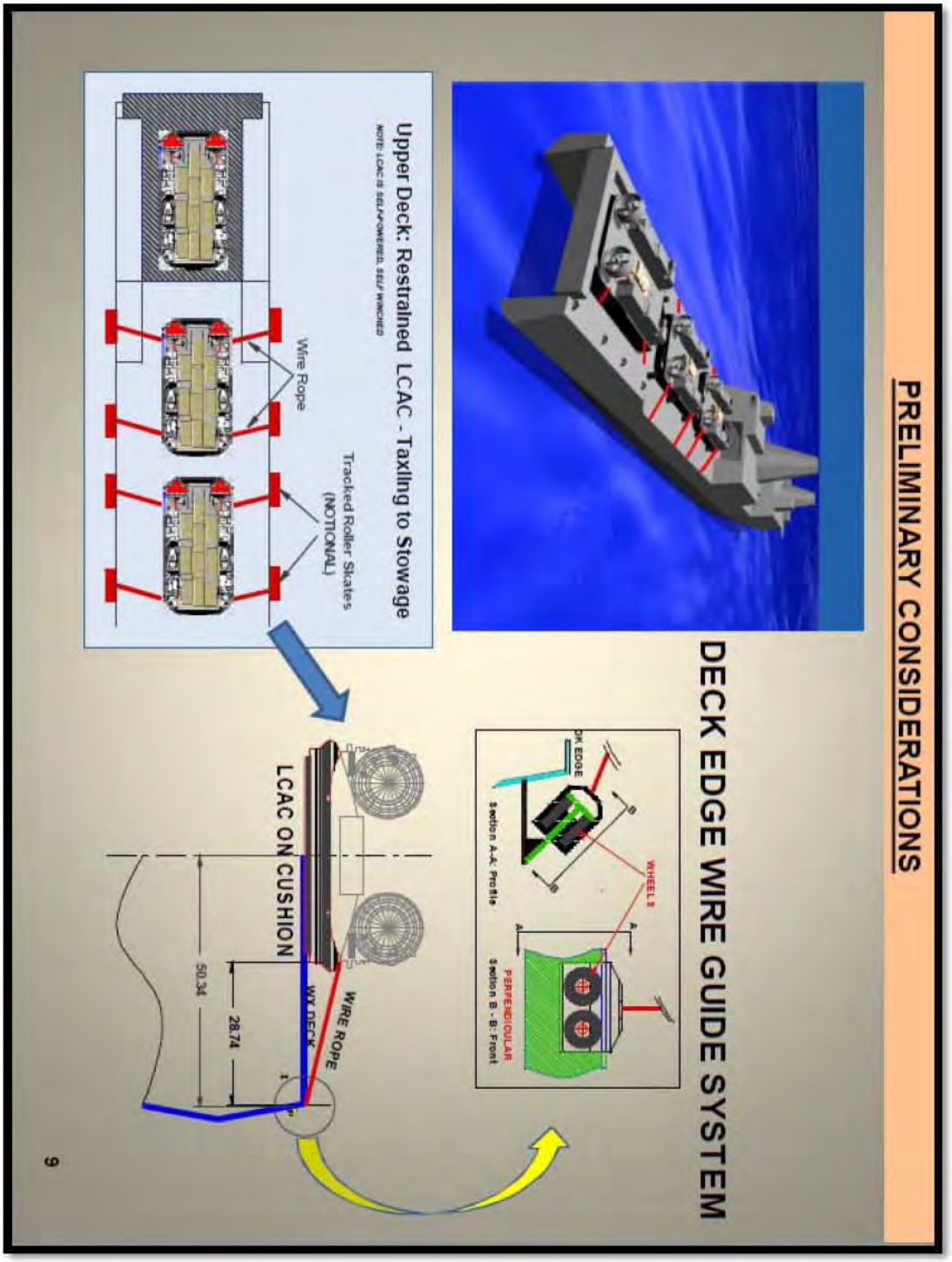
[4] Center for Strategic and International Studies. Tough Choices, by Martin Leed and Benjamin Moody. Washington D.C., 2011,3 http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf (accessed November 20, 2011)

Appendix 4 - MEU Comparison[5]



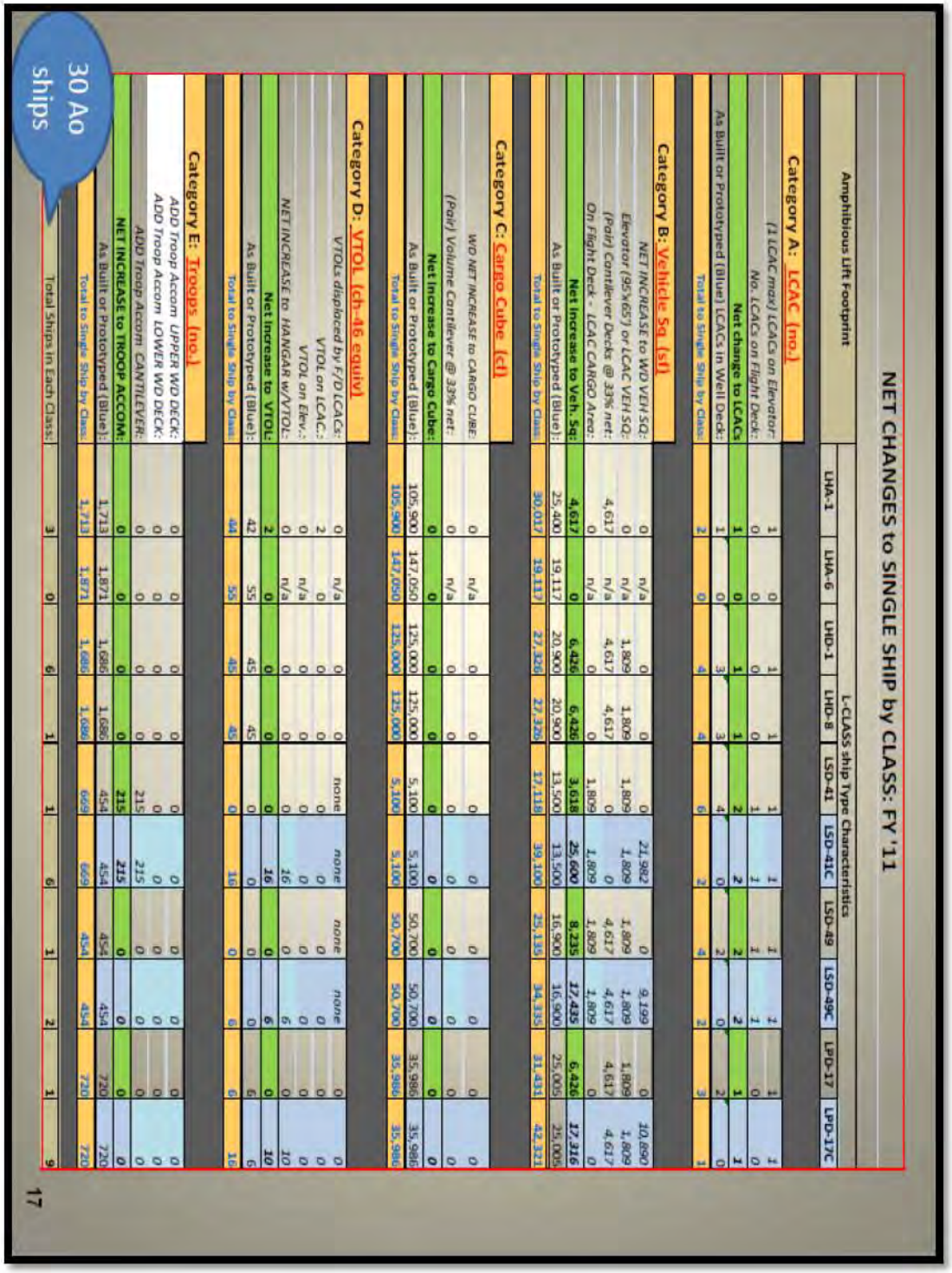
[5] 24th MEU Information: Marine Forces Command Brief, 20 January, 2010. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=2&sqi=2&ved=0CCkQFjAB&url=http%3A%2F%2Fwww.tasctgic.org%2Fdownloads%2Fpresentation%2FMGWILSON_20%2520JAN_FINAL.ppt&ei=hRJxT7IDcPf0QHludTXBg&usg=AFQjCNHslNi8DJUIhE32KOj7-z6edqIhBw (Accessed 20 Mar, 2012)

Appendix 5 – Landing Craft, Air Cushion – Lander, Launcher, Loader, Lifter[6]



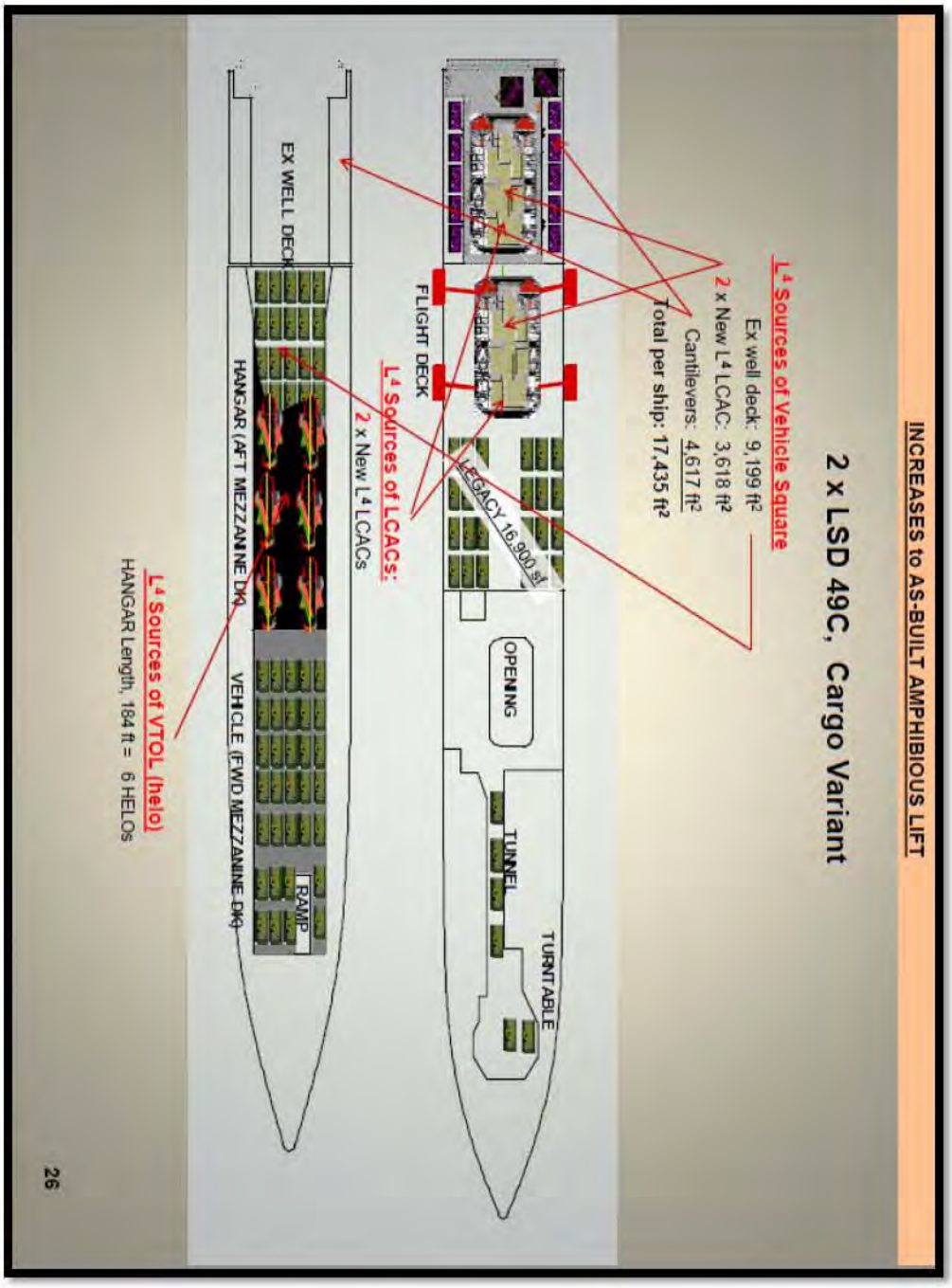
[6] Frank Colangelo, e-mail message to the author, January 10, 2012

Appendix 5 – Landing Craft, Air Cushion – Lander, Launcher, Loader, Lifter[7]



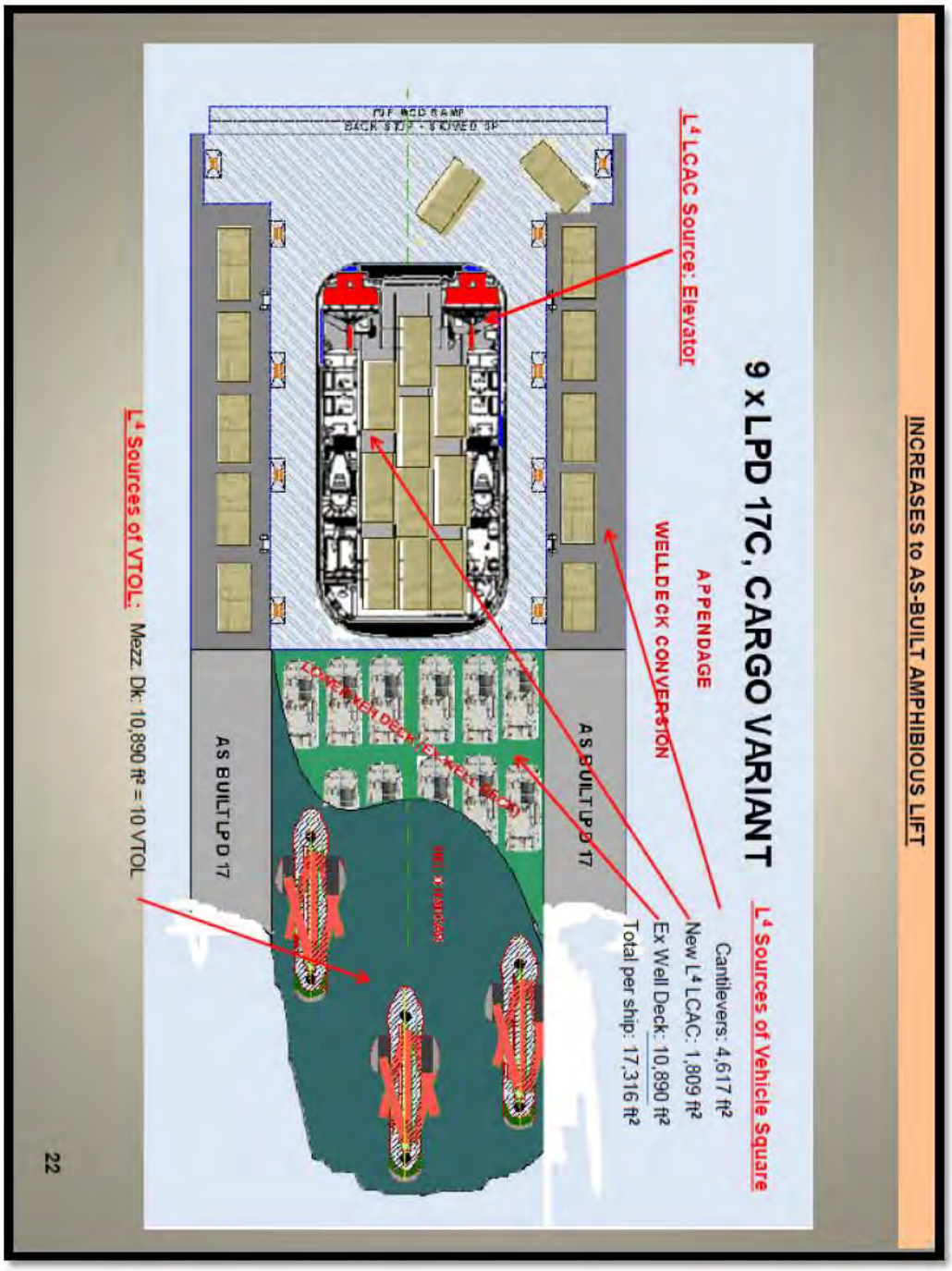
[7] Frank Colangelo, e-mail message to the author, January 10, 2012

Appendix 5 – Landing Craft, Air Cushion – Lander, Launcher, Loader, Lifter[8]



[8] Frank Colangelo, e-mail message to the author, January 10, 2012

Appendix 5 – Landing Craft, Air Cushion – Lander, Launcher, Loader, Lifter[9]



[9] Frank Colangelo, e-mail message to the author, January 10, 2012

A Restructured 21st Century MEU

USS Bataan — East Coast
USS Iwo Jima — East Coast
USS Bonhomme Richard — West Coast

LHD

LCAC L4 System: NO – (2) LCU

USS San Antonio — East Coast
USS Mesa Verde — East Coast
USS New Orleans — West Coast

LPD 17

Vehicle Square Increase: 17,316 Cargo Cubed Increase: 0

LCAC L4 System: YES – (2) LCAC

USS Carter Hall — East Coast
USS Oak Hill — East Coast
USS Pearl Harbor — West Coast

LSD 49

Vehicle Square Increase: 17,435 Cargo Cubed Increase: 0

LCAC L4 System: YES – (2) LCAC

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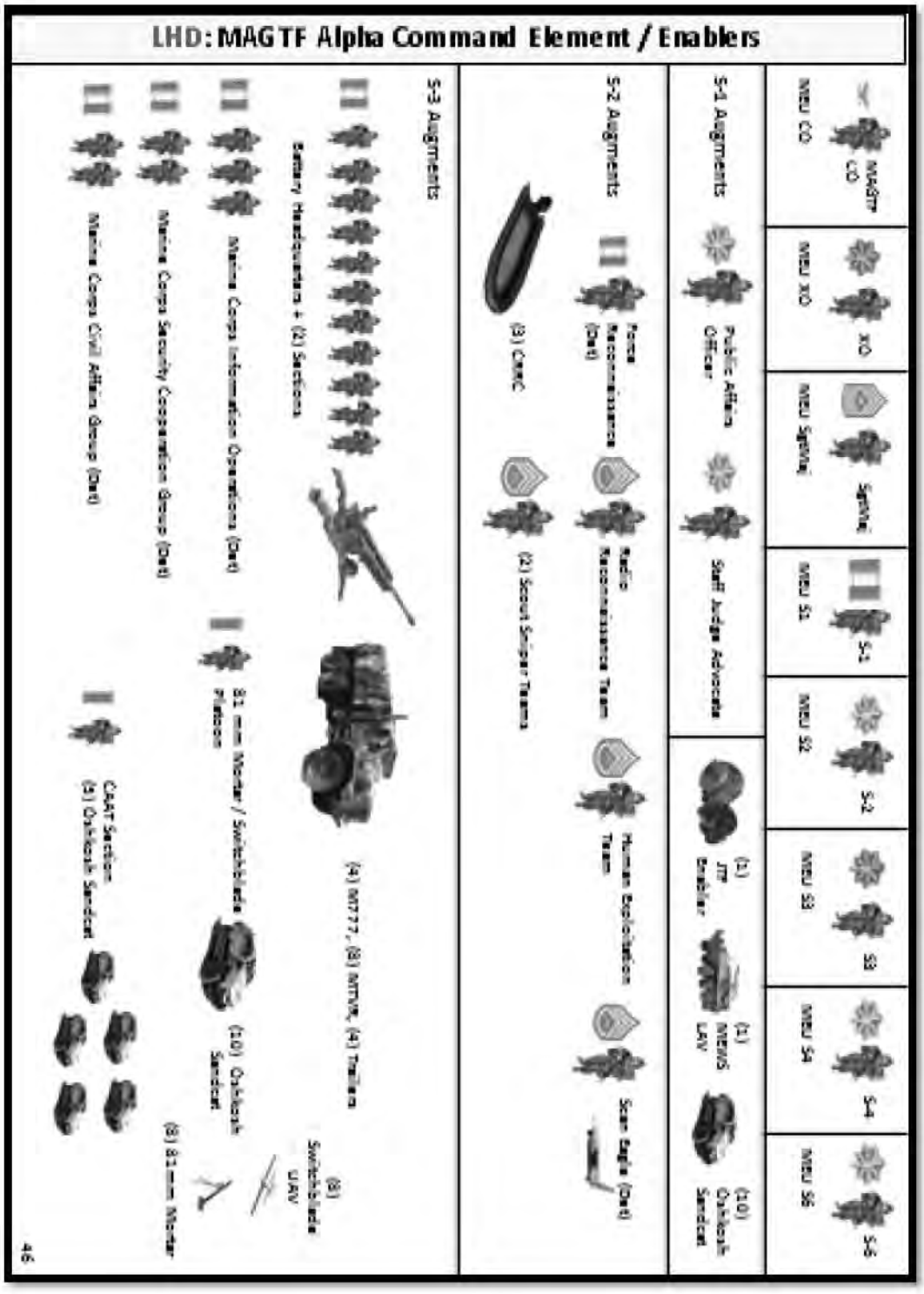
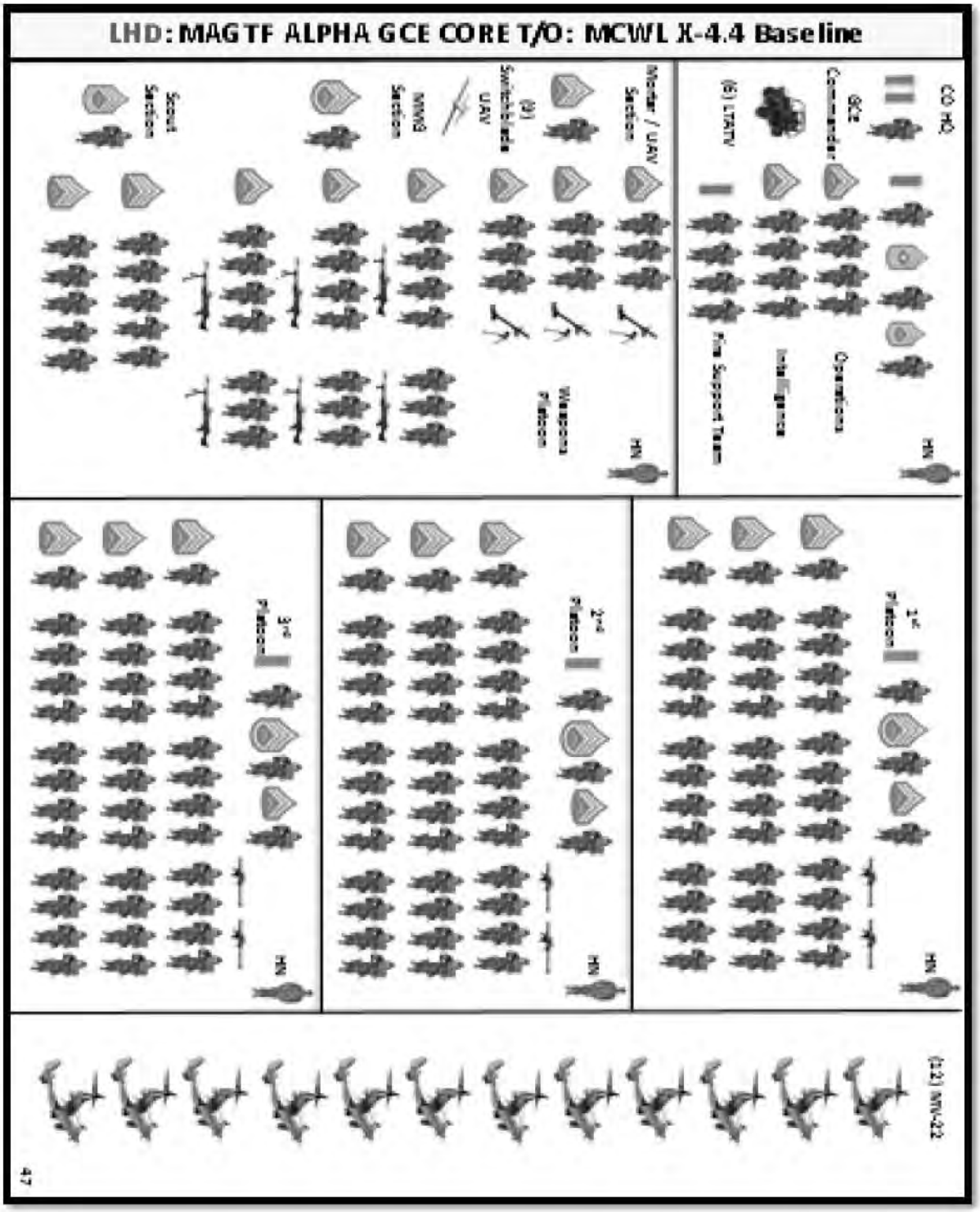
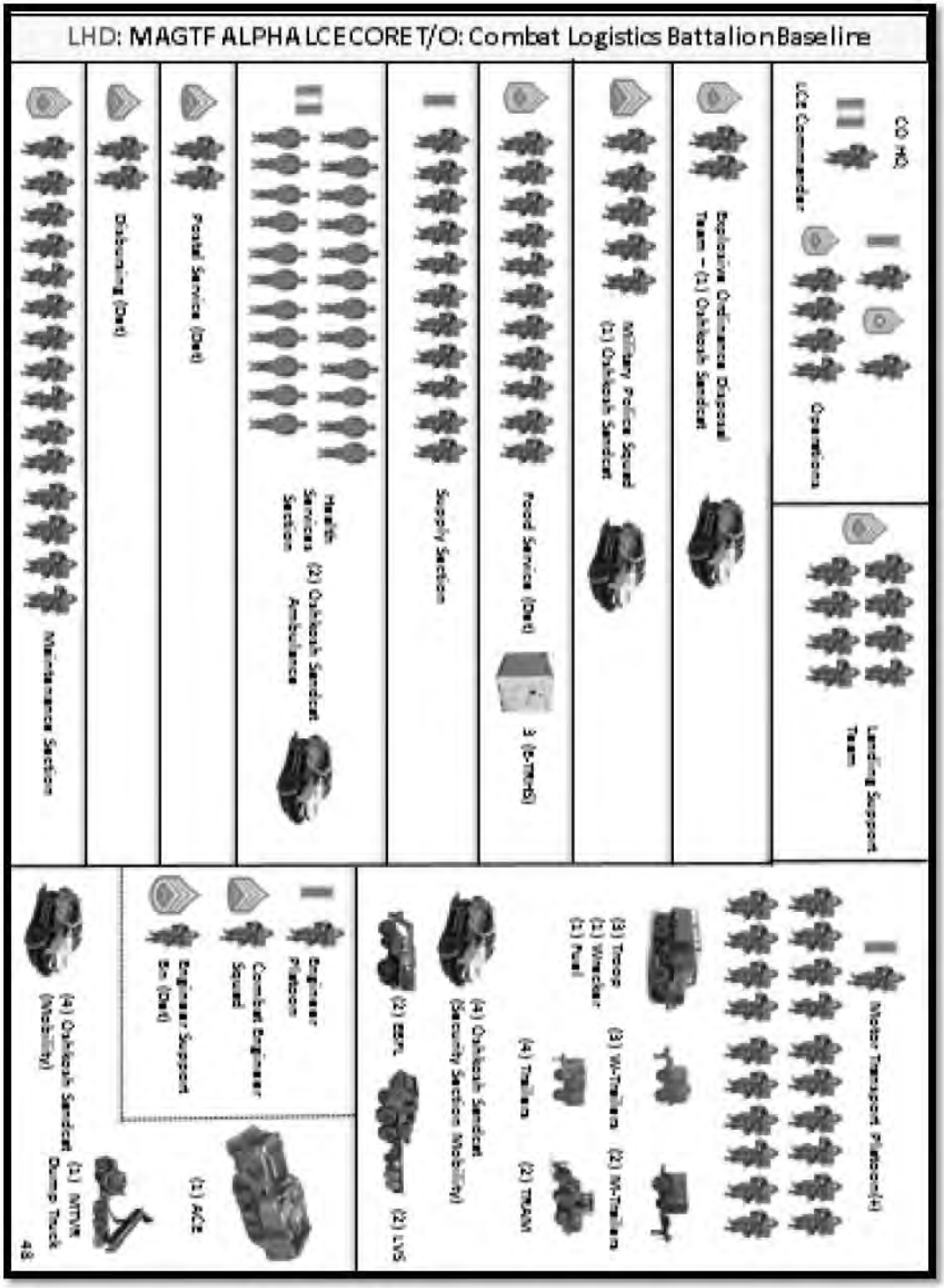
Appendix 6 – Restructured MEU Model



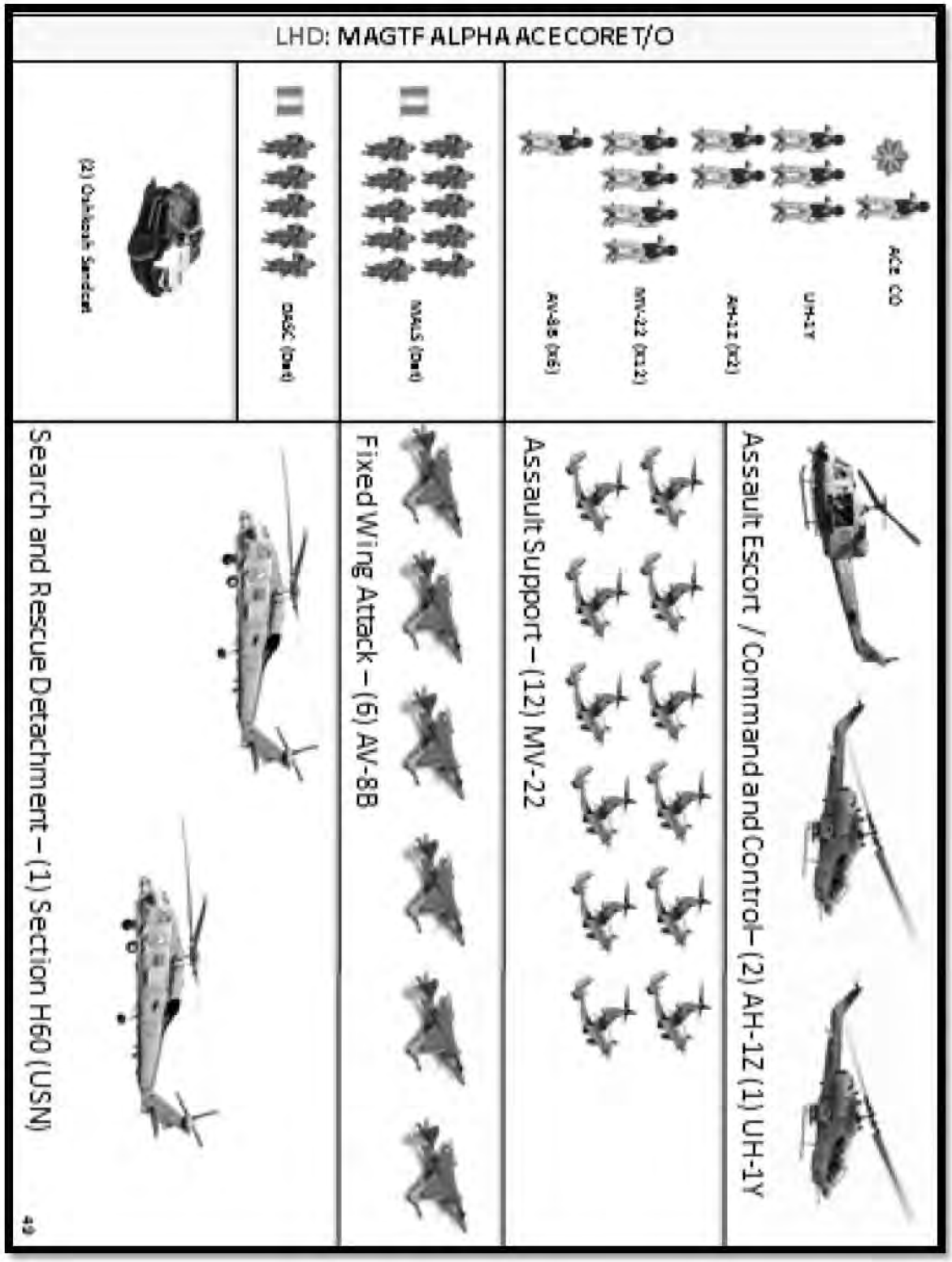
Appendix 6 – Restructured MEU Model



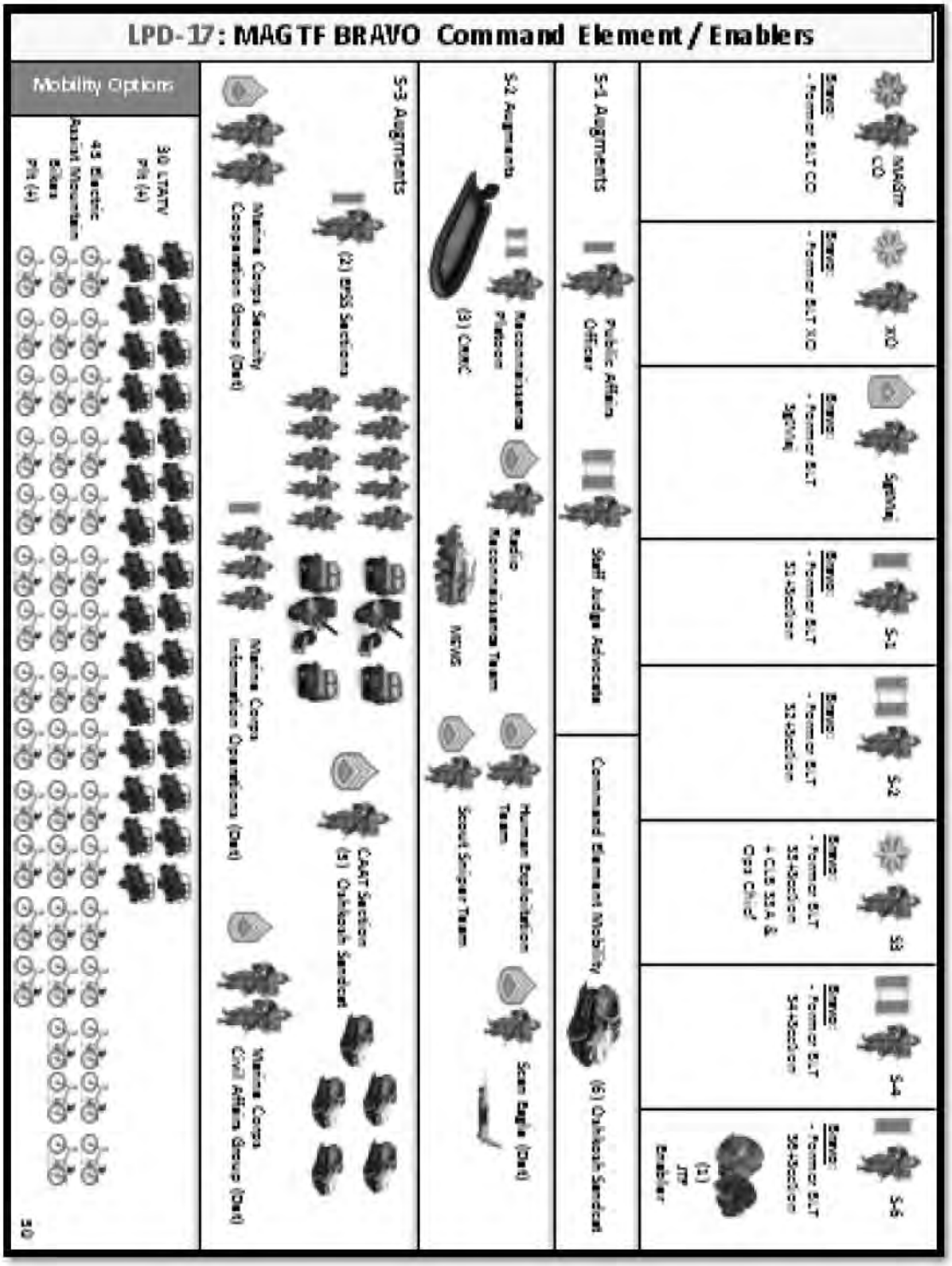
Appendix 6 – Restructured MEU Model



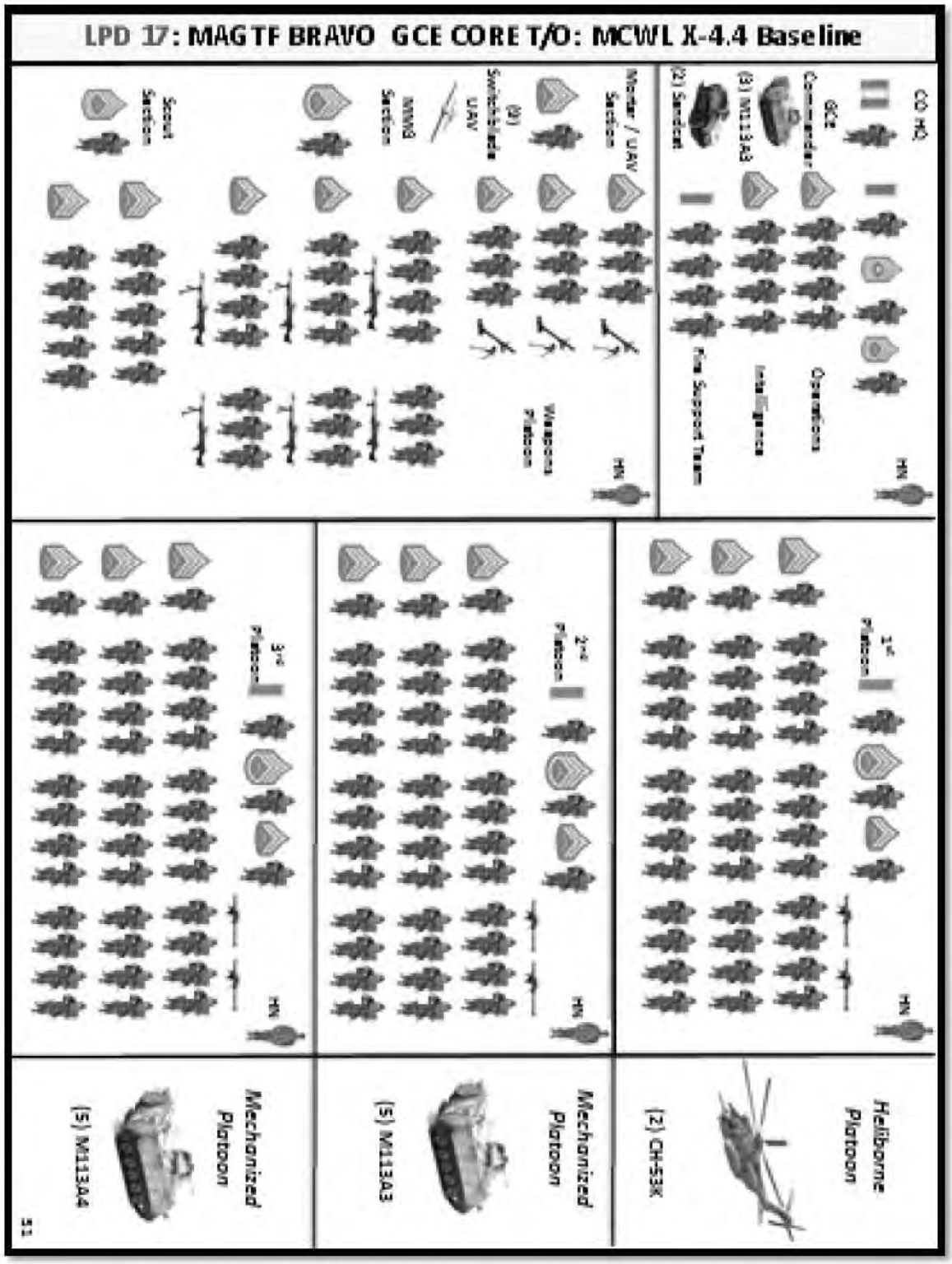
Appendix 6 – Restructured MEU Model



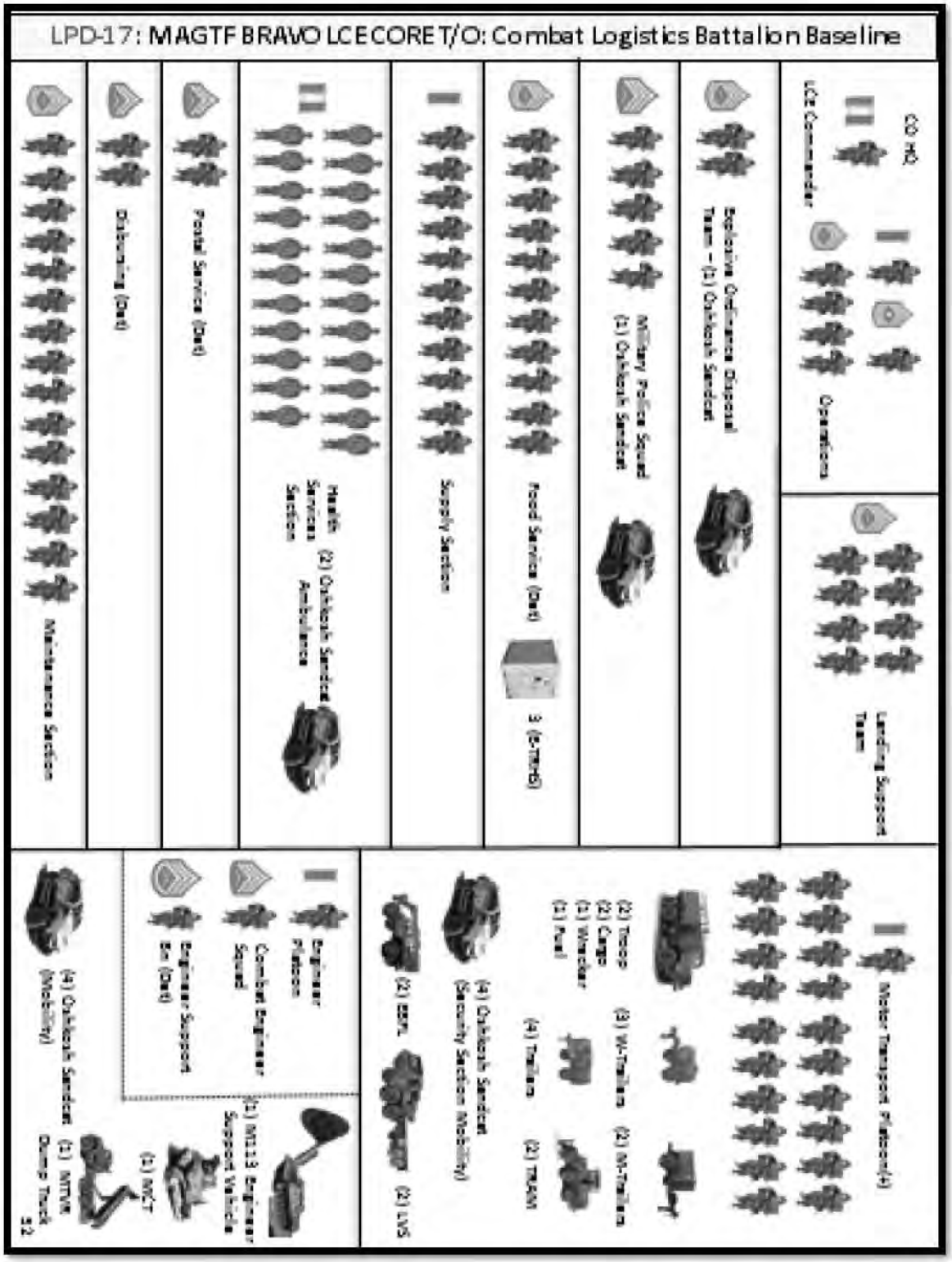
Appendix 6 – Restructured MEU Model



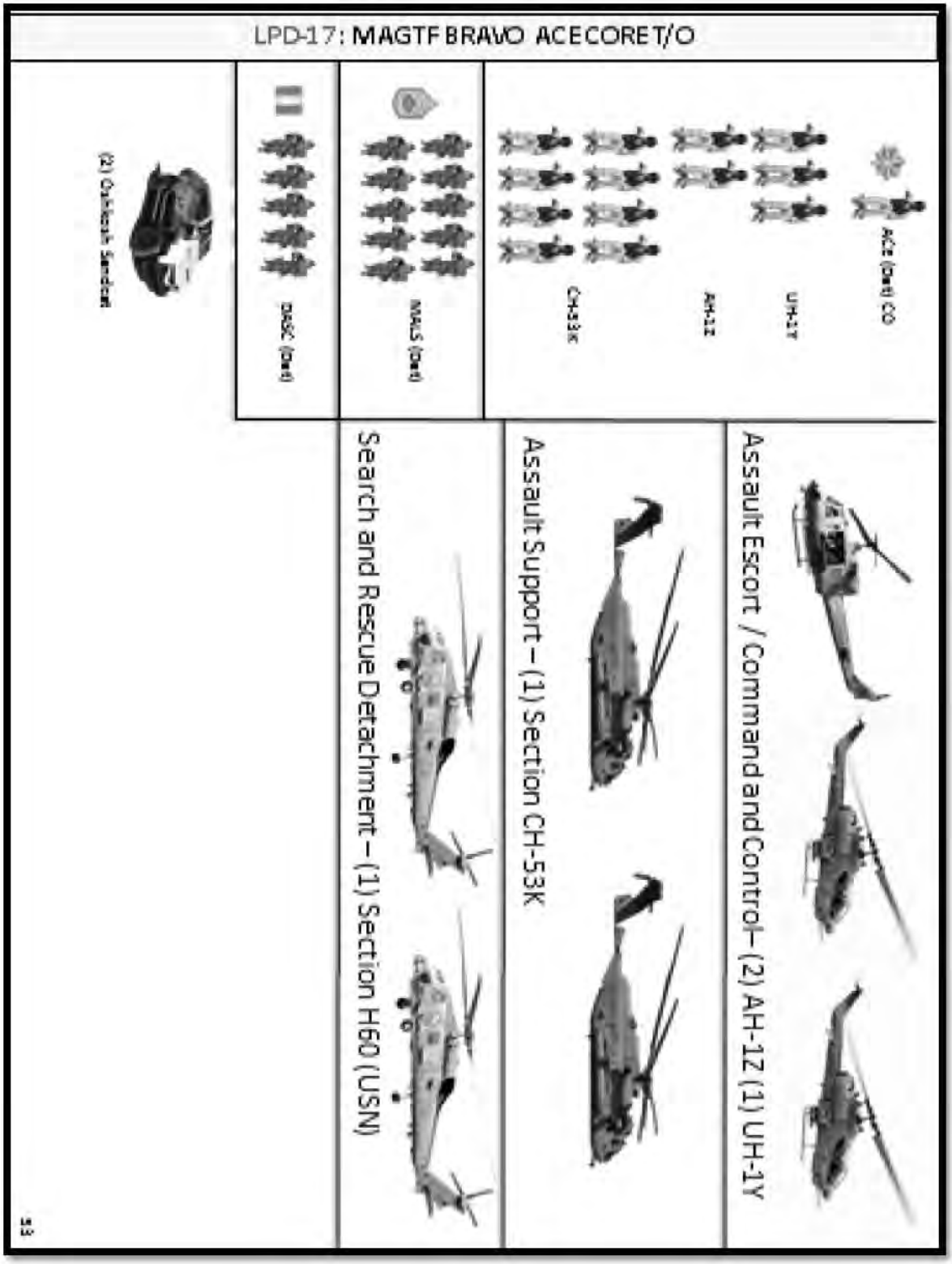
Appendix 6 – Restructured MEU Model



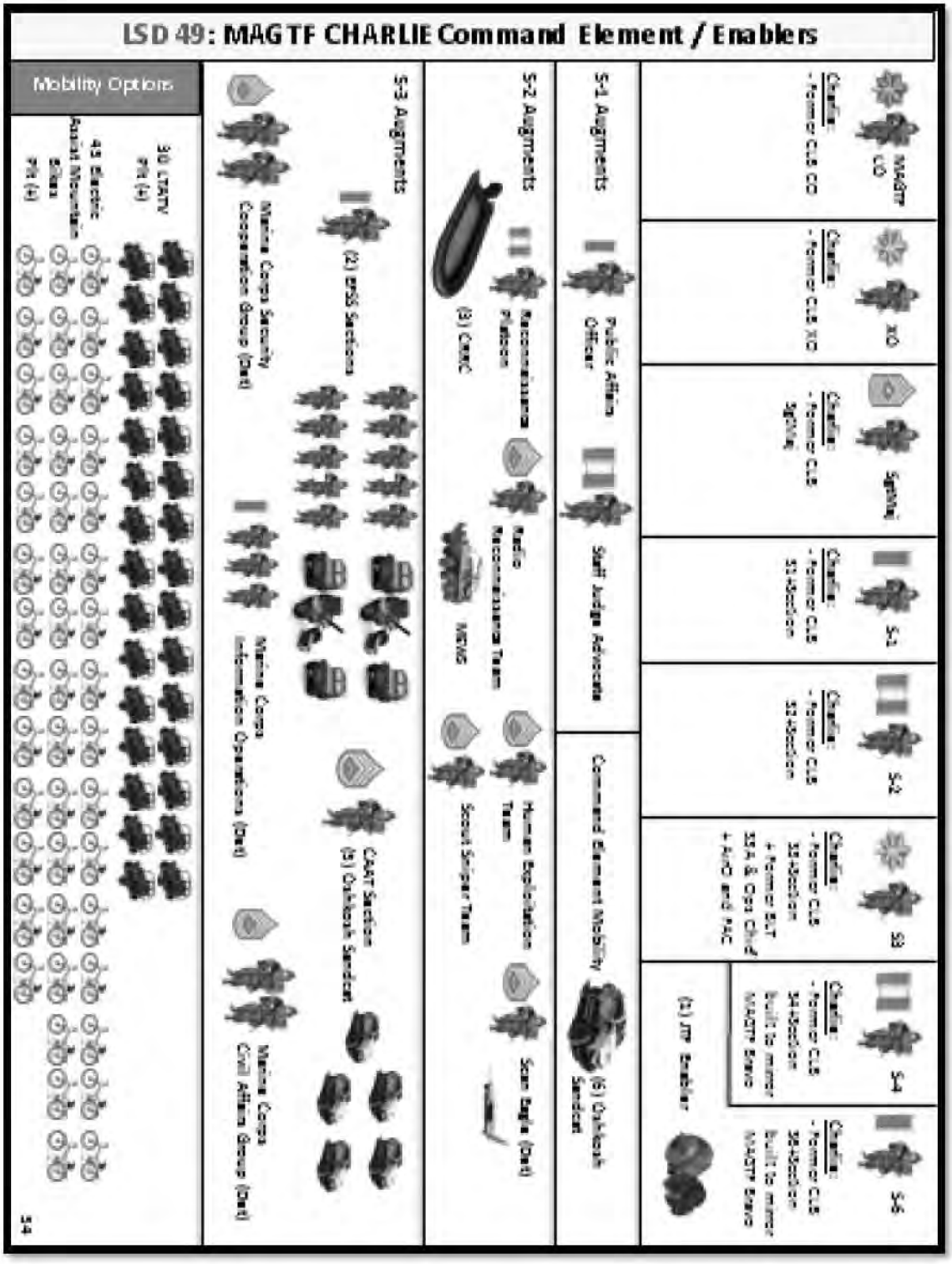
Appendix 6 – Restructured MEU Model



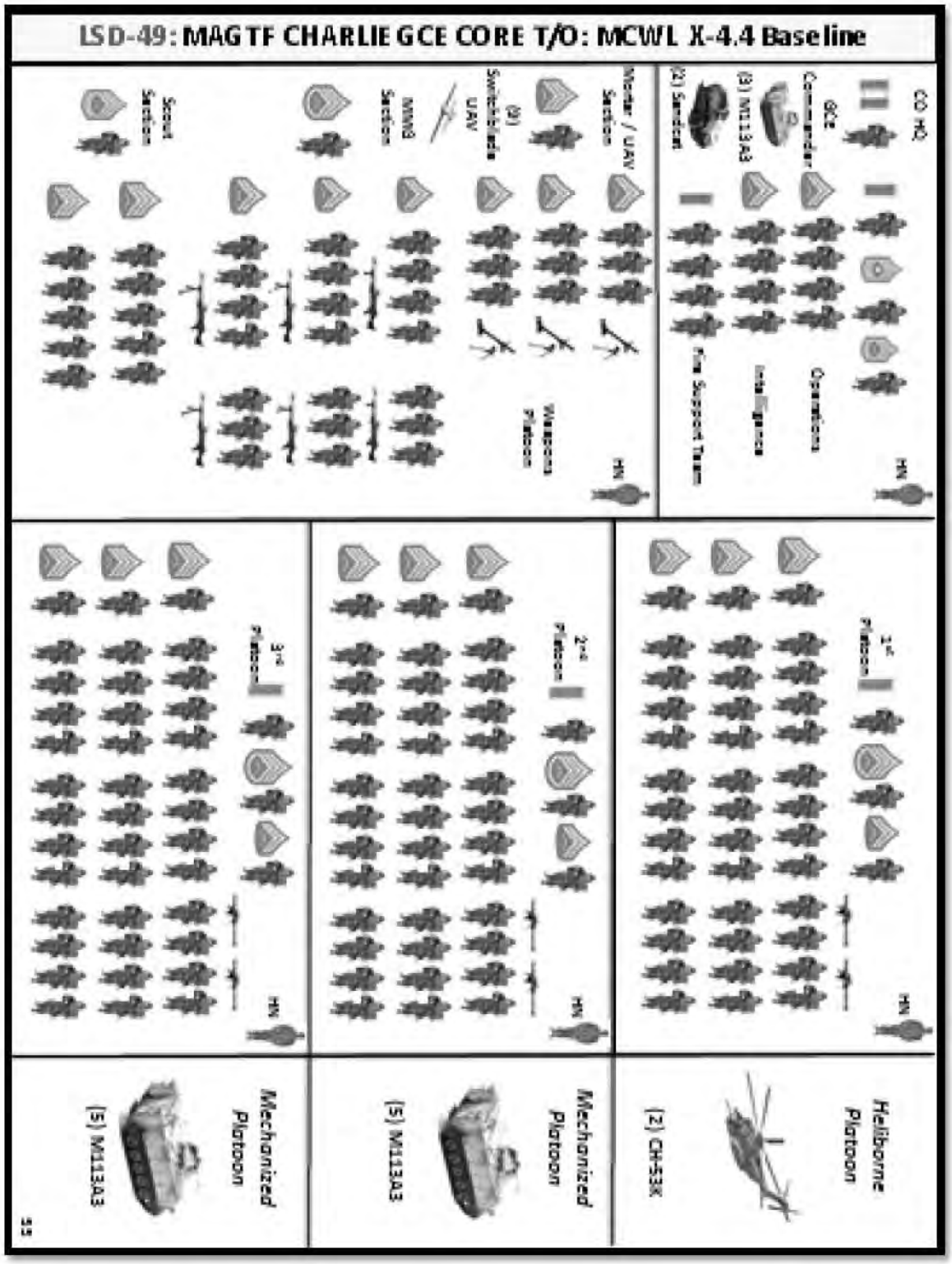
Appendix 6 – Restructured MEU Model



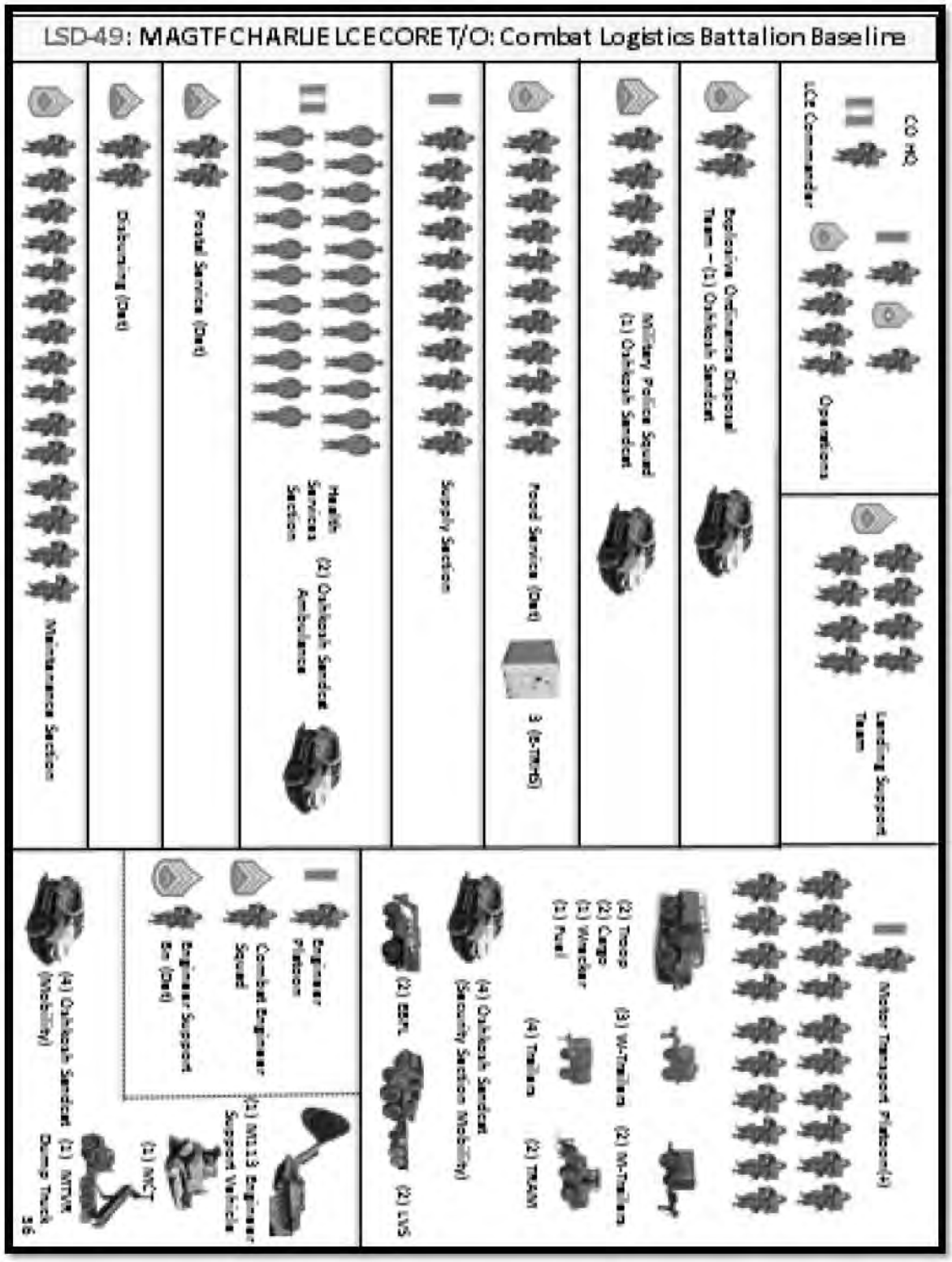
Appendix 6 – Restructured MEU Model



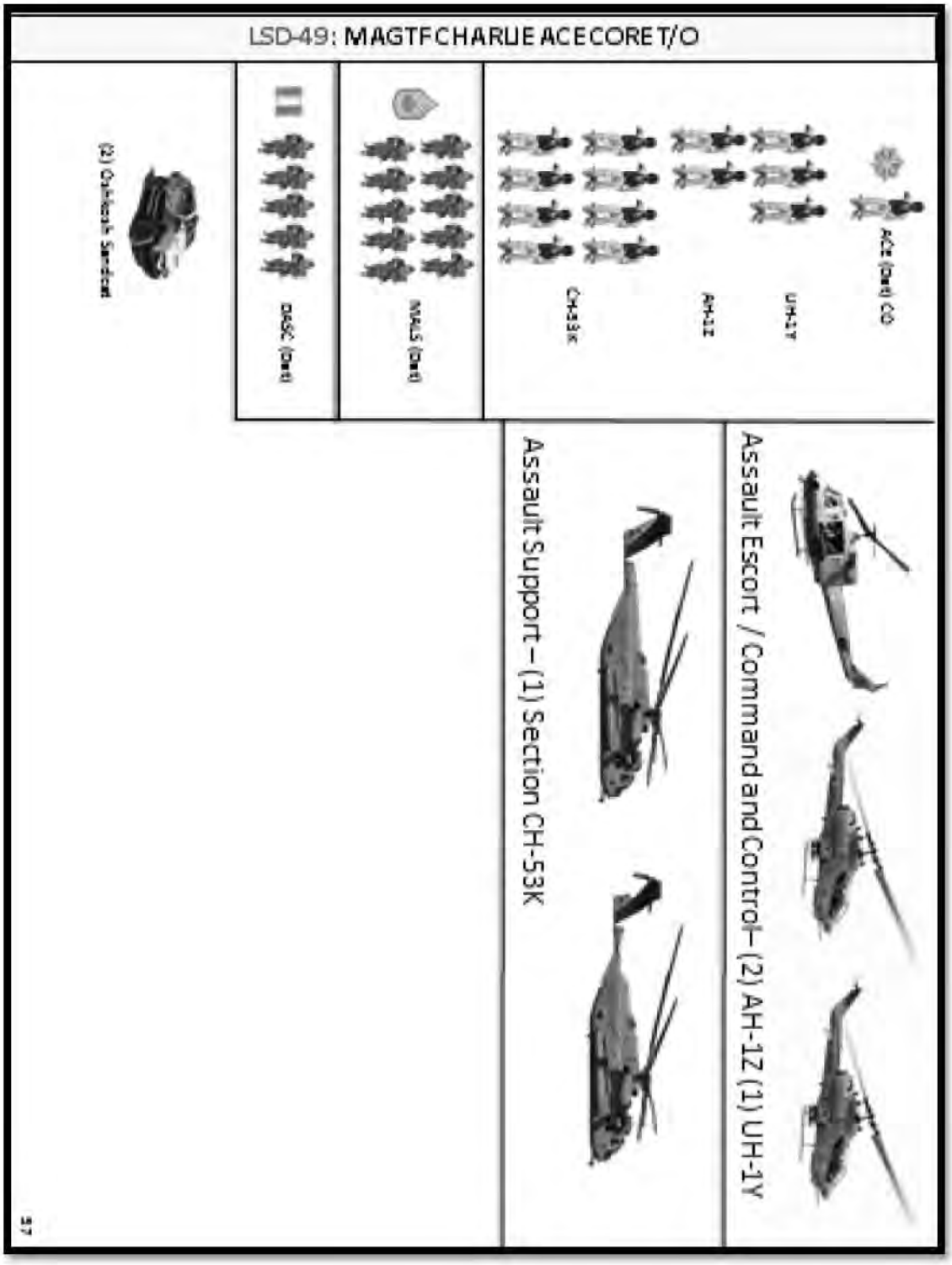
Appendix 6 – Restructured MEU Model



Appendix 6 – Restructured MEU Model



Appendix 6 – Restructured MEU Model



Appendix 7 – Administrative Load Plan Test

Restructured 21st Century MEU Administrative Load Plan Test

Load Plan developed by: Gunnery Sergeant Ryan Ralph
Embarkation Instructor: Expeditionary Warfare Training Group, Atlantic

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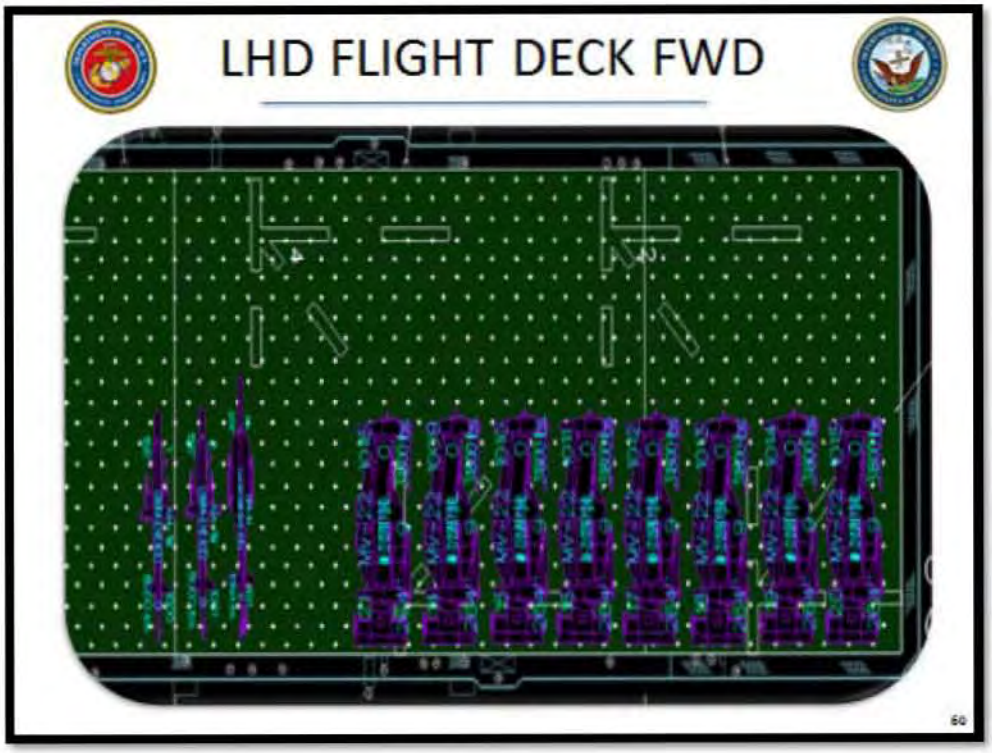
Technical Data

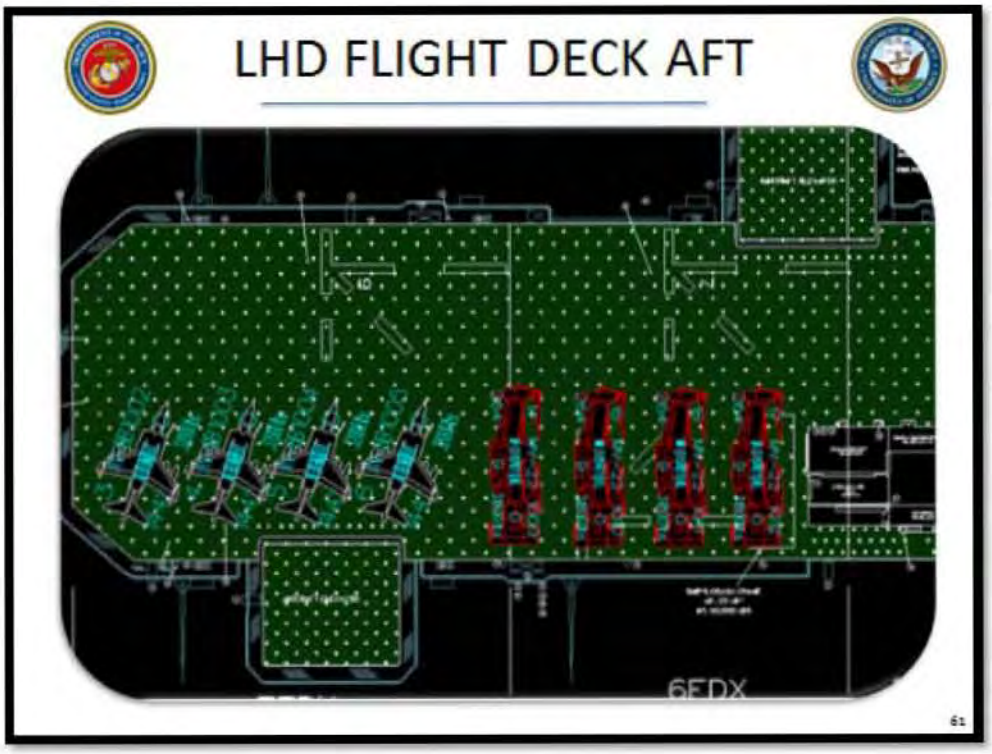
	Weight	Length	Width	Height	Resource
MEWS Light Armored Vehicle	26180	234	99	103	MDSS II Technical Data
Amphibious Assault Vehicle (P7)	46360	317	147	178	MDSS II Technical Data
Amphibious Assault Vehicle (C7)	47300	311	126	176	MDSS II Technical Data
Amphibious Assault Vehicle (R7)	52069	321	129	126	MDSS II Technical Data
M777 Howitzer	9840	373	100	87	TM 8000-10
MTVR	33380	315	98	125	MDSS II Technical Data
M-LPV Sandcat	15432	205	88	92	OshKosh Website
Internally Transportable Vehicle (ITV)	3300	161	60	77	http://en.wikipedia.org/wiki/Growler_(vehicle)
Armored Combat Earthmover	35500	246	126	105	MDSS II Technical Data
Medium Crawler Tractor	69800	219	102	141	TM 11275-15
Logistics Vehicle System Replacement(LVSR)	53000	426	98	102	MDSS II Technical Data
M113A3 – Armored Personnel Carrier	27000	192	106	98	http://www.globalsecurity.org/military/systems/ground/m113-specs.htm
Light-All Terrain Vehicle	1200	108	60	71	https://www.fbo.gov/index?tab=documents&tabmode=form&subtab=core&tabid=[illegible]
Electric Assist Mountain Bike	No Data	No Data	No Data	No Data	
Combat Rubber Recon Craft (CRRC)	265	185	75	30	MDSS II Technical Data
MV-22	31800	684	226	264	MDSS II Technical Data
CH-53E	46000	1188	288	336	MDSS II Technical Data
AH-1W	8000	696	132	156	MDSS II Technical Data
UH-1N	6500	684	108	168	MDSS II Technical Data
AV-8B	32000	552	360	144	MDSS II Technical Data

A limited number of AAV's were embarked in this model in place of M113A3's IOT determine if there was space available for such a modification

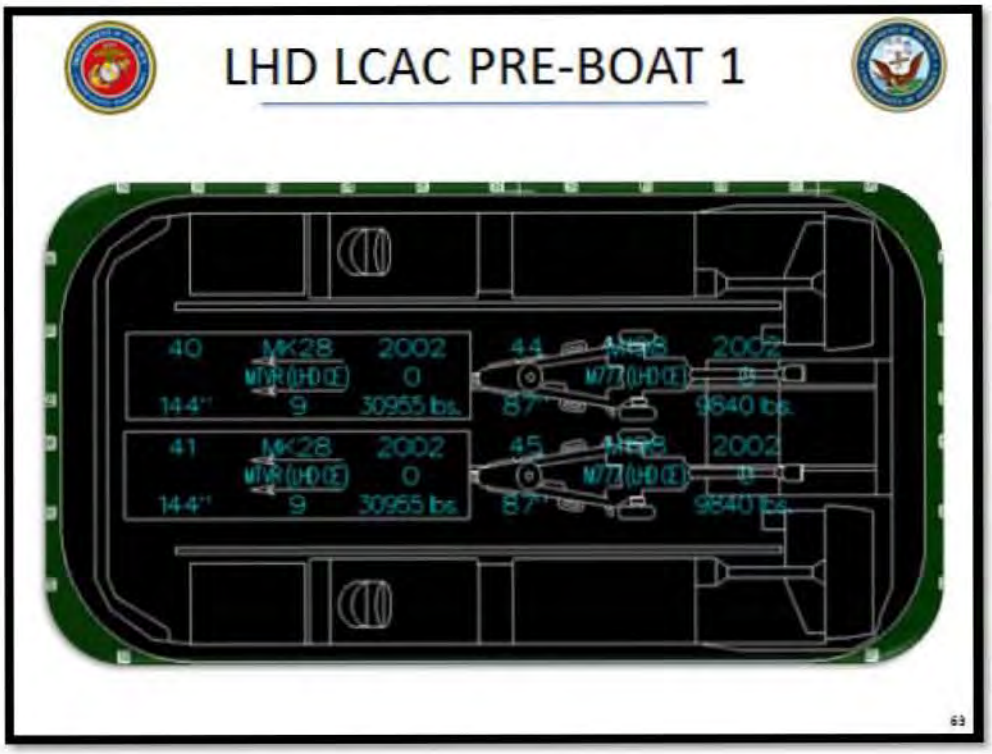
59

Appendix 7 – Administrative Load Plan Test

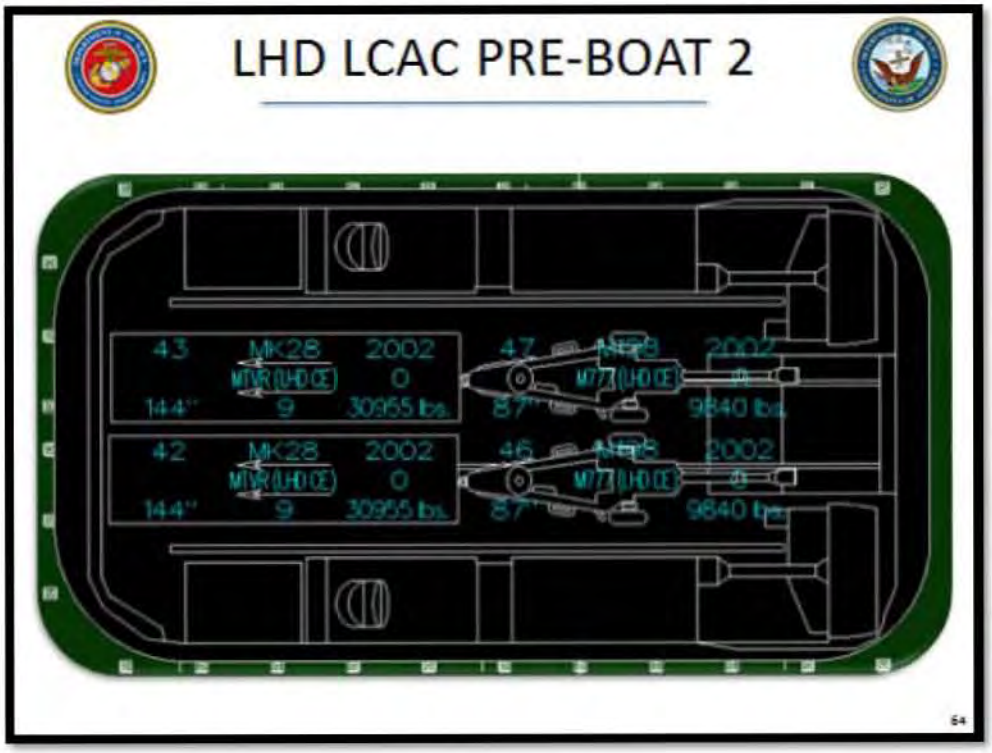


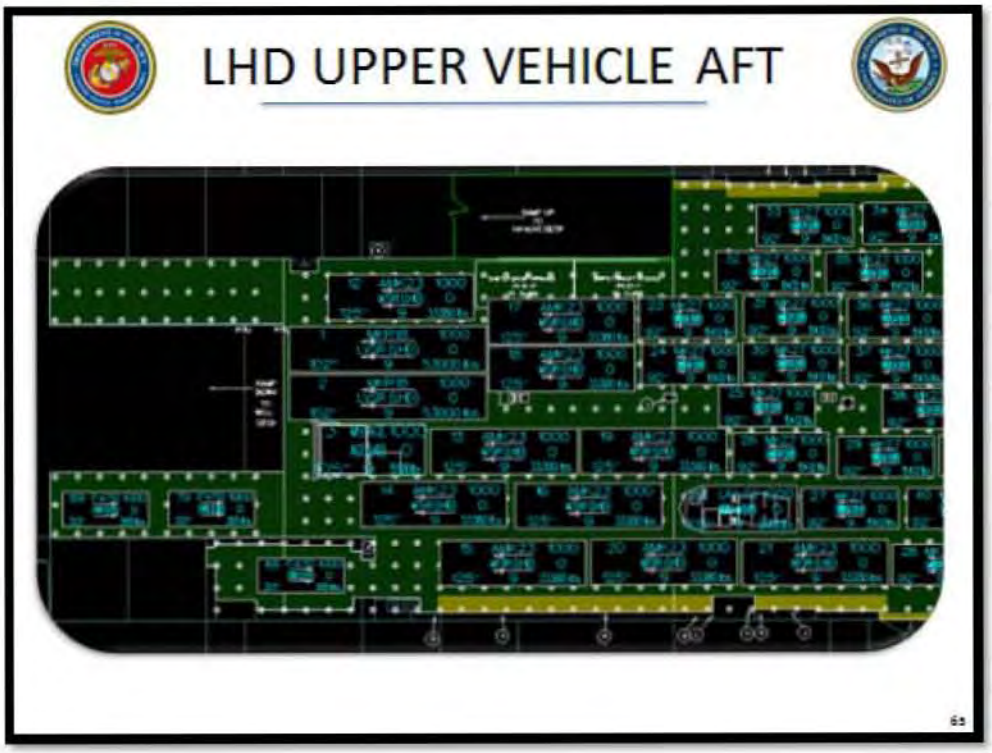


Appendix 7 – Administrative Load Plan Test



Appendix 7 – Administrative Load Plan Test





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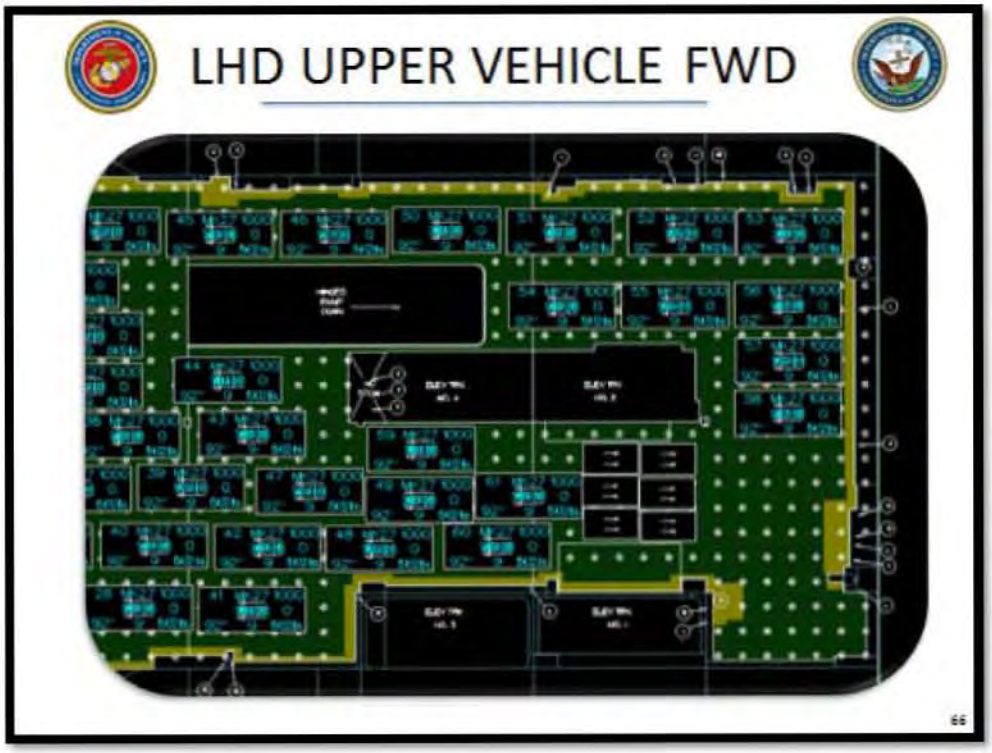

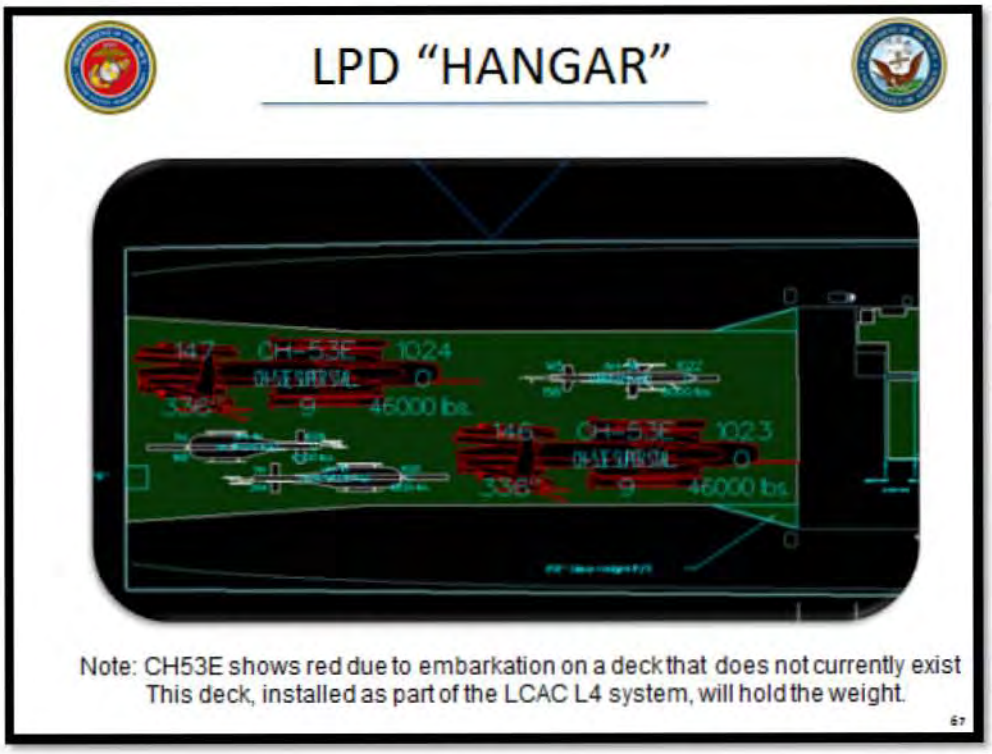

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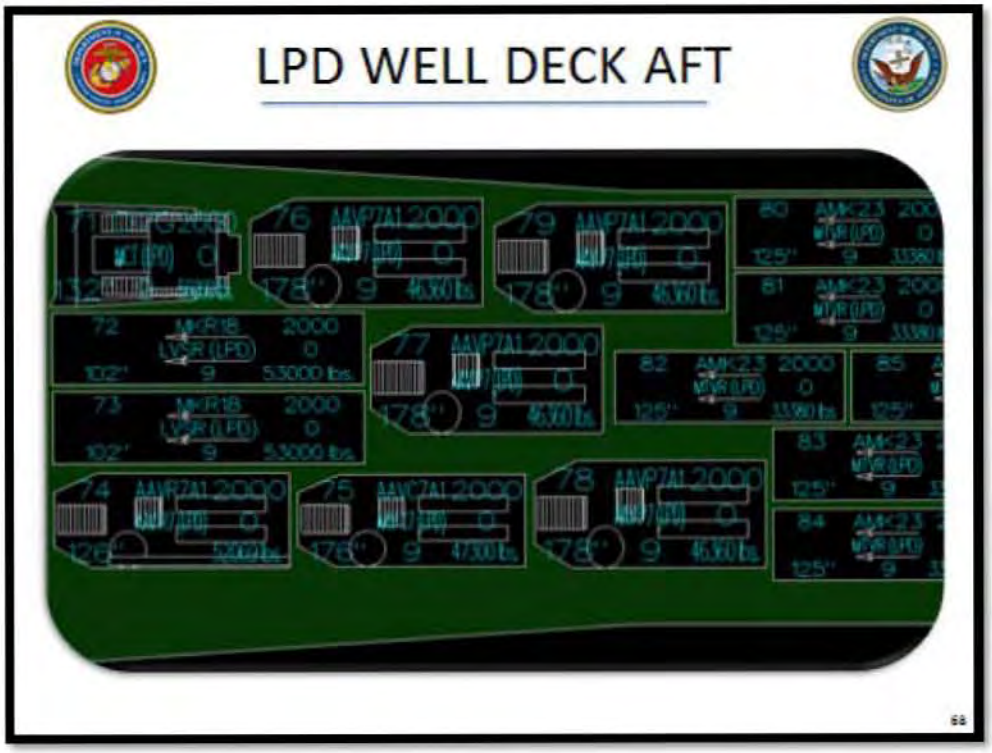

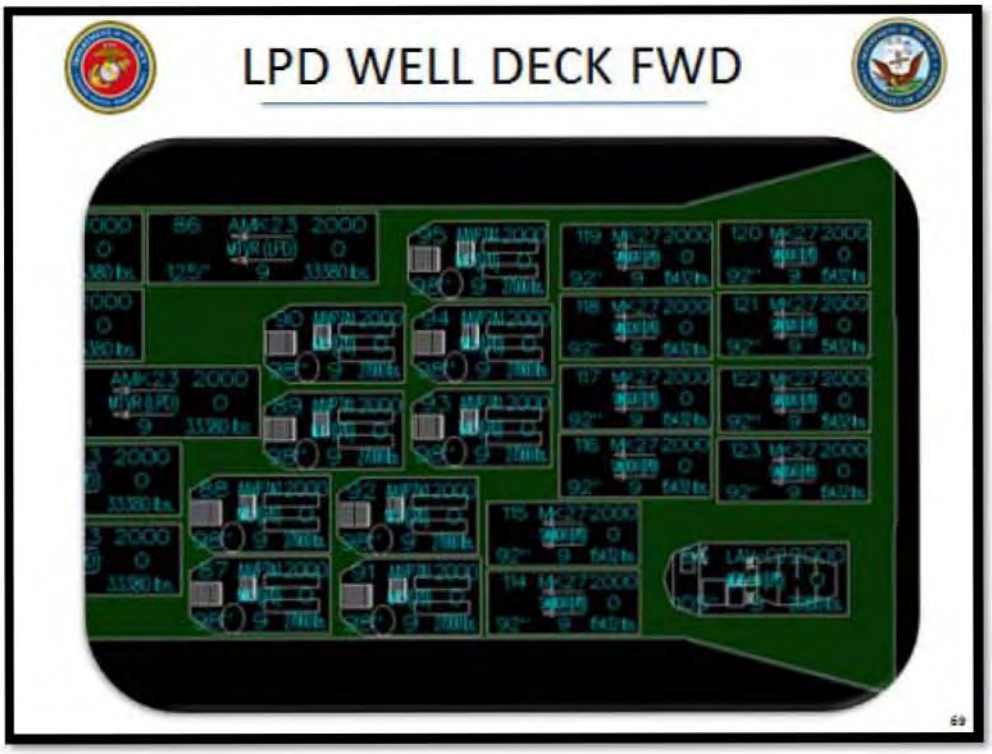

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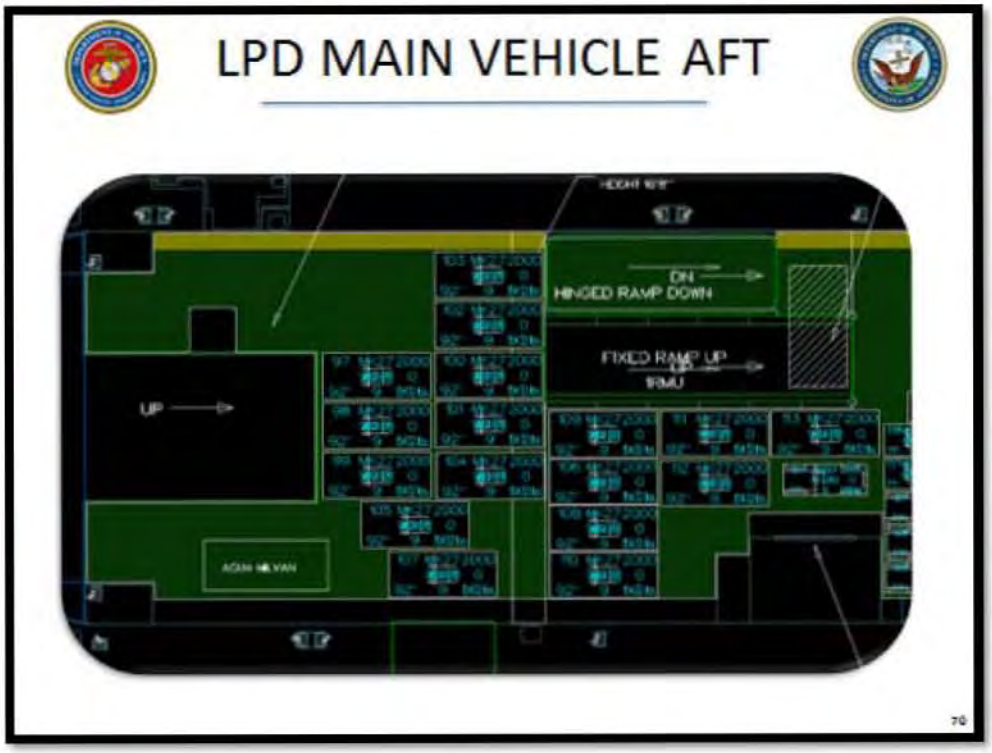
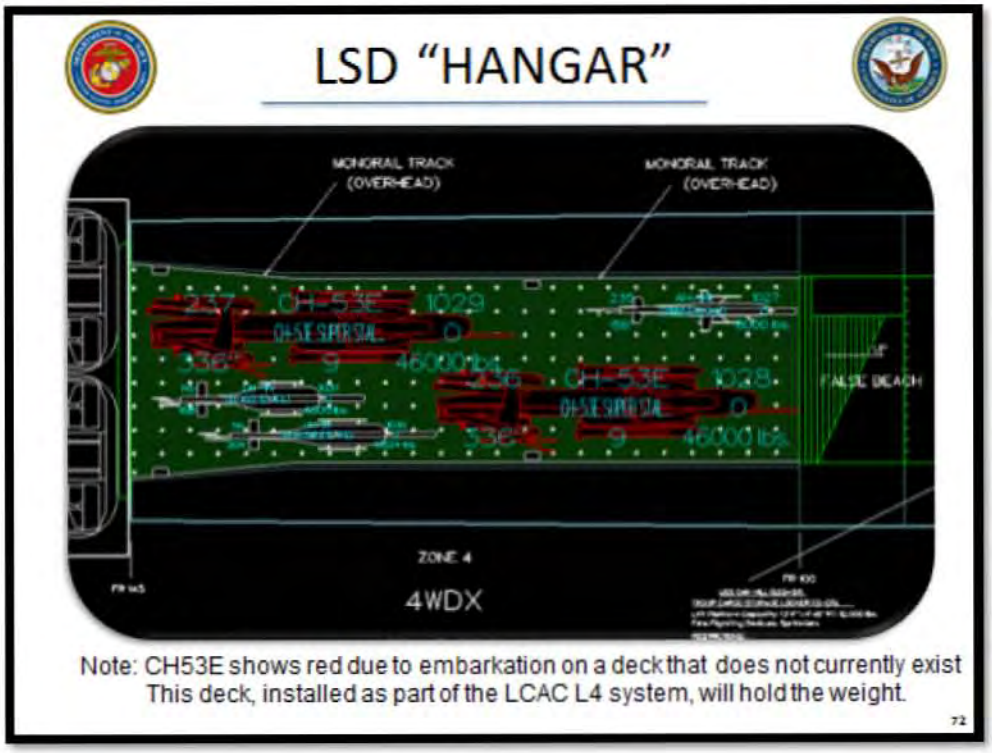
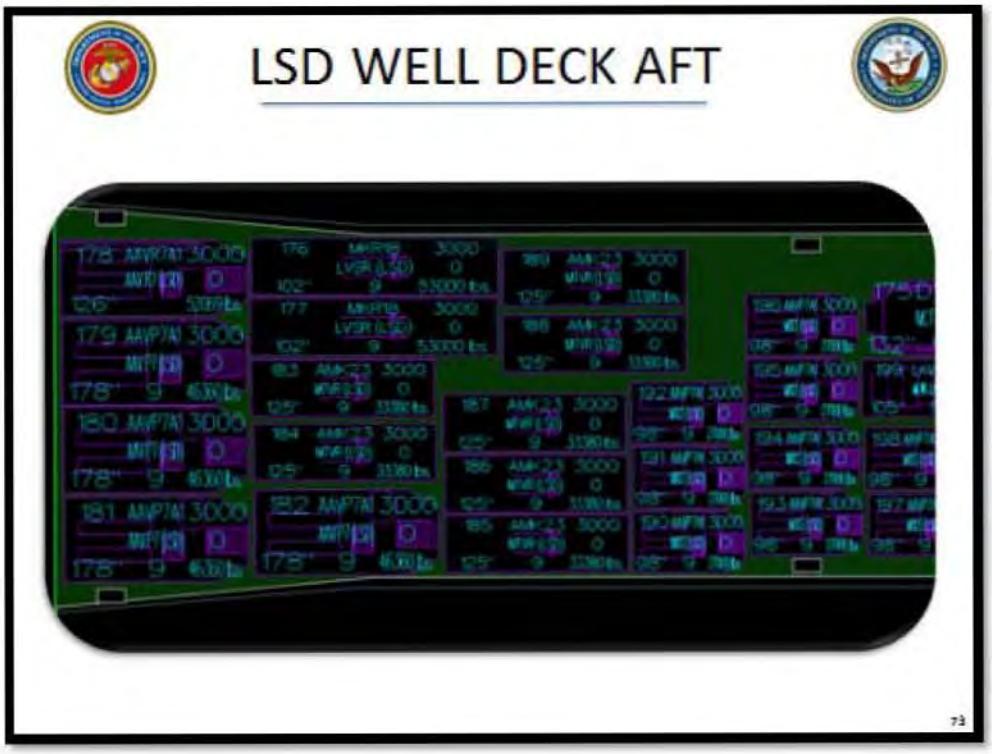
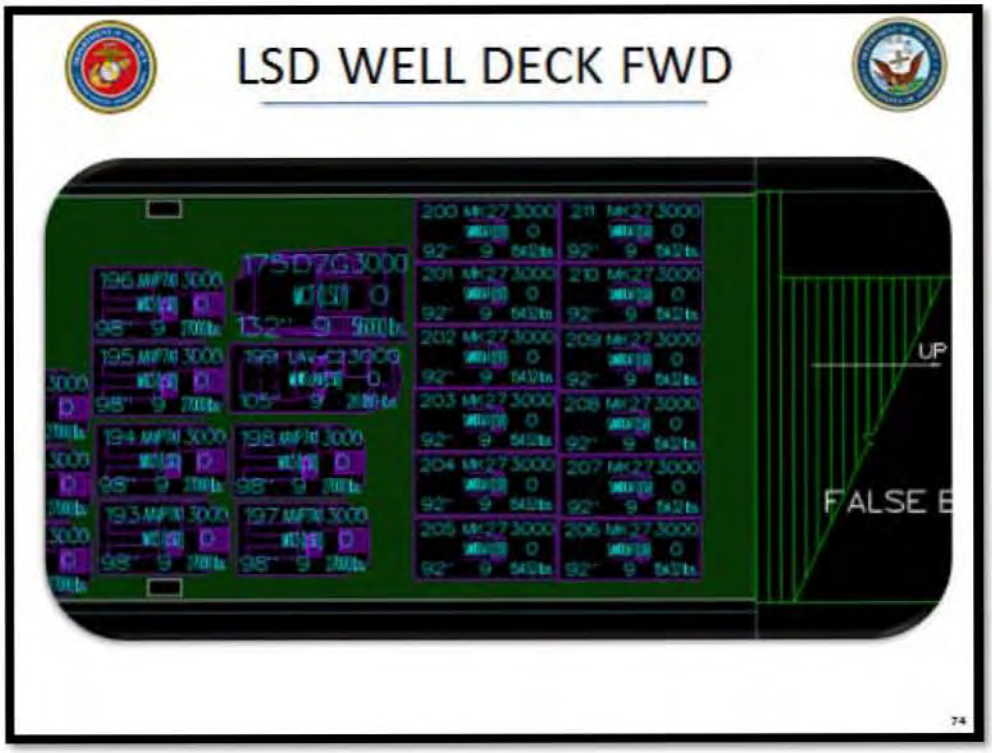


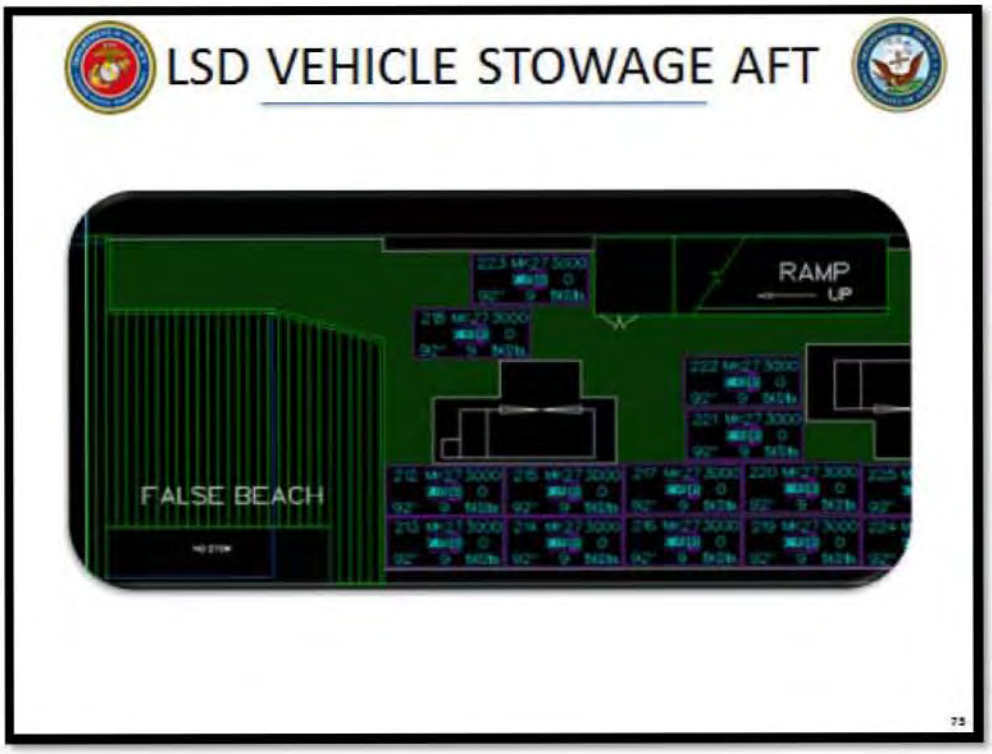
Appendix 7 – Administrative Load Plan Test



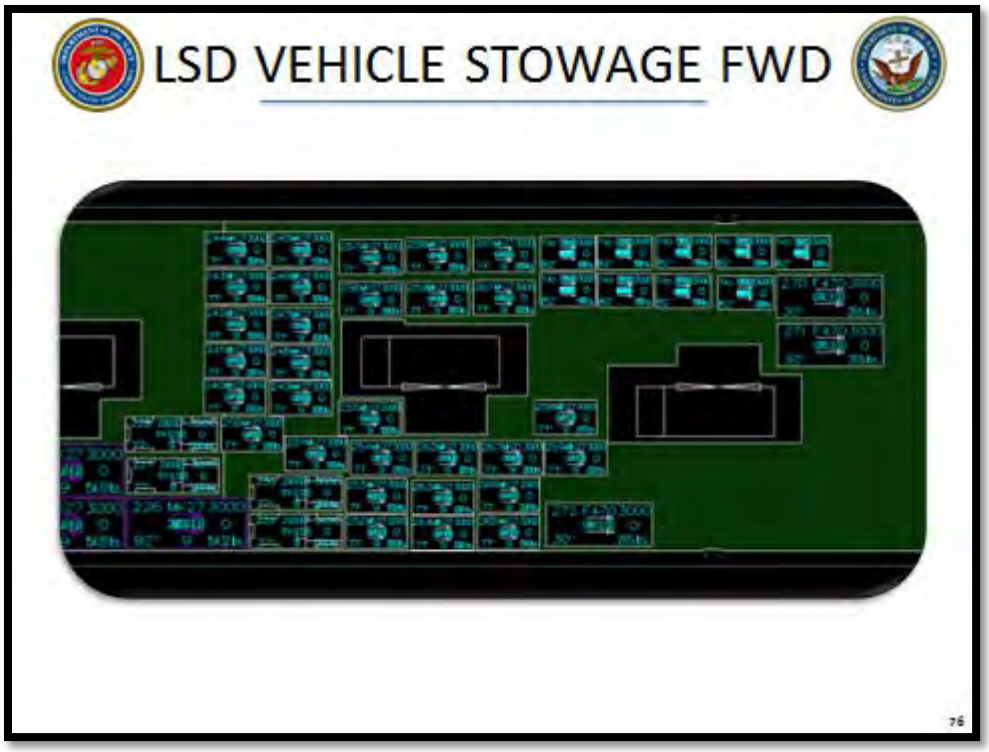


Appendix 7 – Administrative Load Plan Test

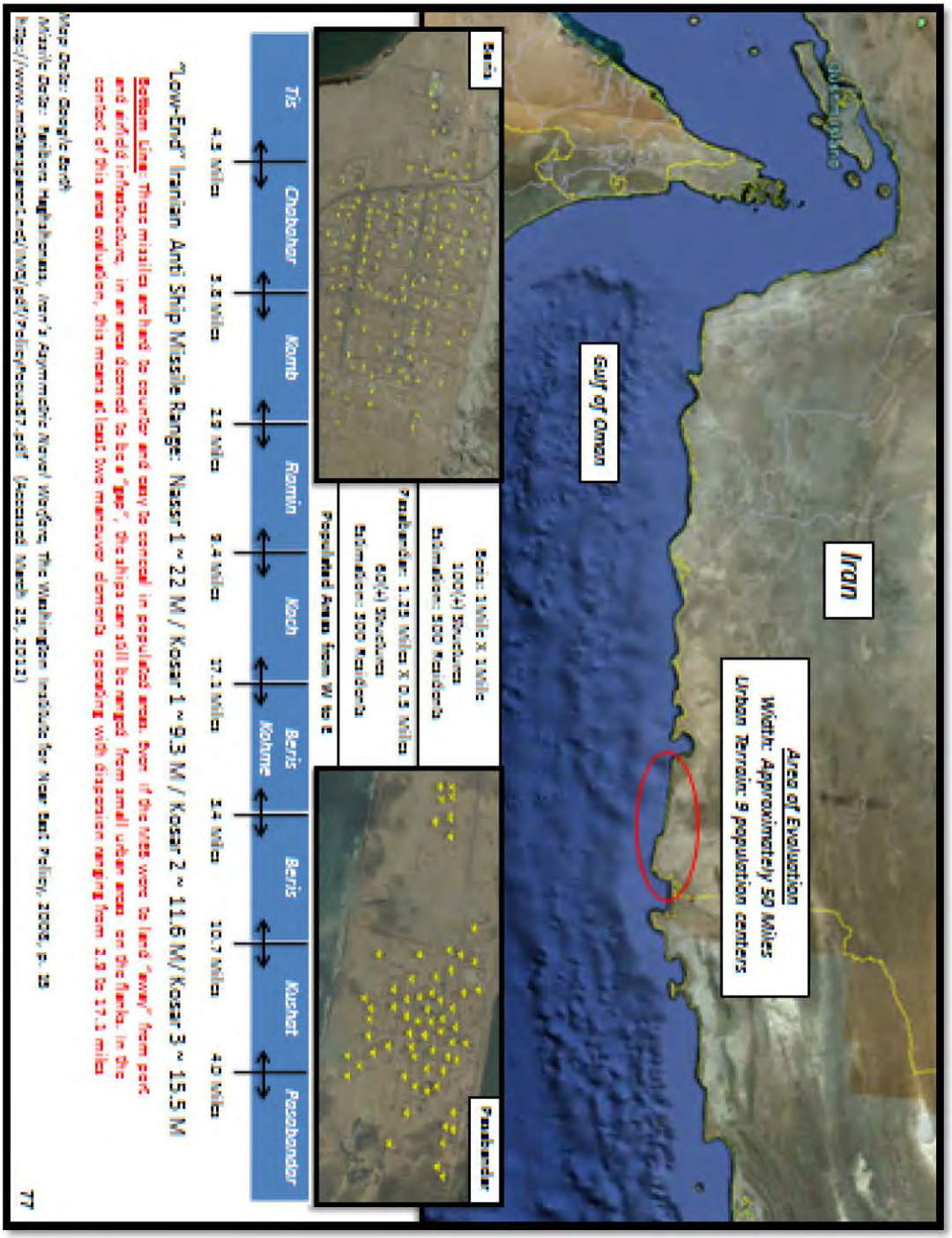




Appendix 7 – Administrative Load Plan Test



Appendix 8 – Landing Area Study[10]



[10] Missile Data: Fariborz Haghshenass, *Iran's Asymmetric Naval Warfare*, The Washington Institute for Near East Policy, 2008, p. 15
http://www.metransparent.net/IMG/pdf/PolicyFocus87.pdf (Accessed March 25, 2012)

Appendix 9 – M113A3[11]

M113A3 Armored Personnel Carrier, a full-tracked armored personnel carrier provides protected transportation and cross country mobility for personnel and cargo.

A light armored vehicle weighing 27,200 pounds, it carries 11 infantry personnel in addition to the vehicle driver and track commander. It is capable of sustained speeds of 41 mph on level roads and accelerates from 0 to 35 mph in 27 seconds (this compares to 69 seconds for the M113A2).

The M113A3 is a product improved version of the M113A2 with improved transmission and engine. The U.S. Army first identified the need to up-power the M113A2 carrier in the mid-1970s. This need was driven by increases in vehicle weight and a requirement to increase the mobility and survivability of the system. As a result, the "RISE" powertrain was developed and tested at Yuma and Aberdeen Proving Grounds. However, application of the new powertrain was deferred due to a lack of funds.

In 1984 a decision was made to incorporate the RISE package, improved driver controls, spall liners, external fuel tanks and provisions for installation of an external armor kit on an M113 chassis. Additionally, a bolt-on armor kit providing 14.5 mm ballistic protection was developed and tested. Except for the mounting provisions the external armor applique was not incorporated for production.

The new X200-4/4A hydrostatic steer transmission permits use of a more powerful engine, the 275 HP turbocharged Detroit Diesel 6V53T, and eliminates the transfer case and controlled differential. The RISE powerpack increases fuel economy, acceleration, hill climbing speed and braking capabilities and allows the vehicle to maintain speed through corners by accelerating the outer track rather than braking the inner track as on the A2. The increase in horsepower also allows installation of an external armor kit (which increases the gross vehicle weight to 31,000 pounds) and provides mobility comparable to currently fielded vehicles such as the M1 tank and M2/M3 Bradley Fighting Vehicles.

Steering is improved with an automotive-type steering yoke and foot brake arrangement which improves driver control, lessens fatigue and simplifies driver training from that of the A1/A2 steering/braking laterals. Due to load matching ability and increased steering capability, cross country performance is also improved.

Crew survivability is increased by the addition of spall suppression liners and locating the fuel tanks externally, on the rear of the vehicle. The inside of the vehicle (sides, roof and rear) are covered with spall suppression liners which limit troop injuries from the effect of overmatching weapons by restricting the spread of spall when a round penetrates the hull. External fuel tanks free up 16 cubic feet of usable space inside the vehicle and reduce the fire hazard inside the crew compartment. Two tanks and independent valving provide redundancy in the fuel system allowing continued operation when one tank is damaged.

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[11] United Defense Website http://www.uniteddefense.com/www.m113.com/m113a3.html (accessed 25 March, 2012)

Appendix 10 – Switchblade, Miniature Killer Drone[12]

The objective of Project Anubis was the development of a prototype, Non Line of Sight (NLOS) munition enabling engagement of time-sensitive fleeting, high value targets with an armed, tactical miniature aerial system (MAV), operated with 'man-in-the-loop' control for identification, targeting, and attack. The system employs innovative seeker/tracking sensor algorithms that enable engagement of stationary or maneuvering targets ensuring high kill probability. Relying on the weapon's target identification and, close range imaging and precision attack capability, the weapon utilizes a small warhead resulting in 'very low collateral damage'. In fact, Anubis will be able to perform what special operations snipers are doing today - but offer operators more opportunities to strike, perform more complex missions at longer range and ensure maximum safety for the shooter.

The project has already demonstrated such capabilities in 2008, as it achieved the range, accuracy, flight time and lethality to defeat target sets beyond the range of current squad level weapons. In January 2010 small UAV specialist Aerovironment has been awarded the final increment of $1.18 million for the third phase of development. According to the Air Force, Anubis will be able to track-down high-value maneuvering targets flying in 'non-line-of-sight' conditions (hinting at urban warfare). Aerovironment is not relating officially to the Anubis program but has unveiled a similar weapon system called Switchblade. If Anubis is in fact the Switchblade Aerovironment is already offering, it will also have a potential to become an aerial munition offering new capabilities for small UAVs sofar unable to carry out such missions.

AeroVironment describes the Switchblade as the warfighter's “magic bullet”. It can rapidly provide a powerful, but expendable miniature flying Intelligence, Surveillance and Reconnaissance (ISR) package on a Beyond Line-of-Sight (BLOS) target within minutes. This

[12] Defense Update Website http://defense-update.com/products/l/switchblade_31122010.html (accessed March 20, 2012)

miniature, remotely-piloted or autonomous platform can either glide or propel itself via quiet electric propulsion, providing real-time GPS coordinates and video for information gathering, targeting, or feature/object recognition. The vehicle's small size and quiet motor make it difficult to detect, recognize, and track even at very close range. The Switchblade is fully scalable and can be launched from a variety of air and ground platforms.

The Switchblade's payload and launcher, weighing less than six pounds total, can be carried in a backpack by a single soldier. The mini UAV, which sends streaming video and GPS coordinates back to its operator, can be transformed from an intelligence, surveillance and reconnaissance UAV into a mini bomb striking a target beyond the line of sight.

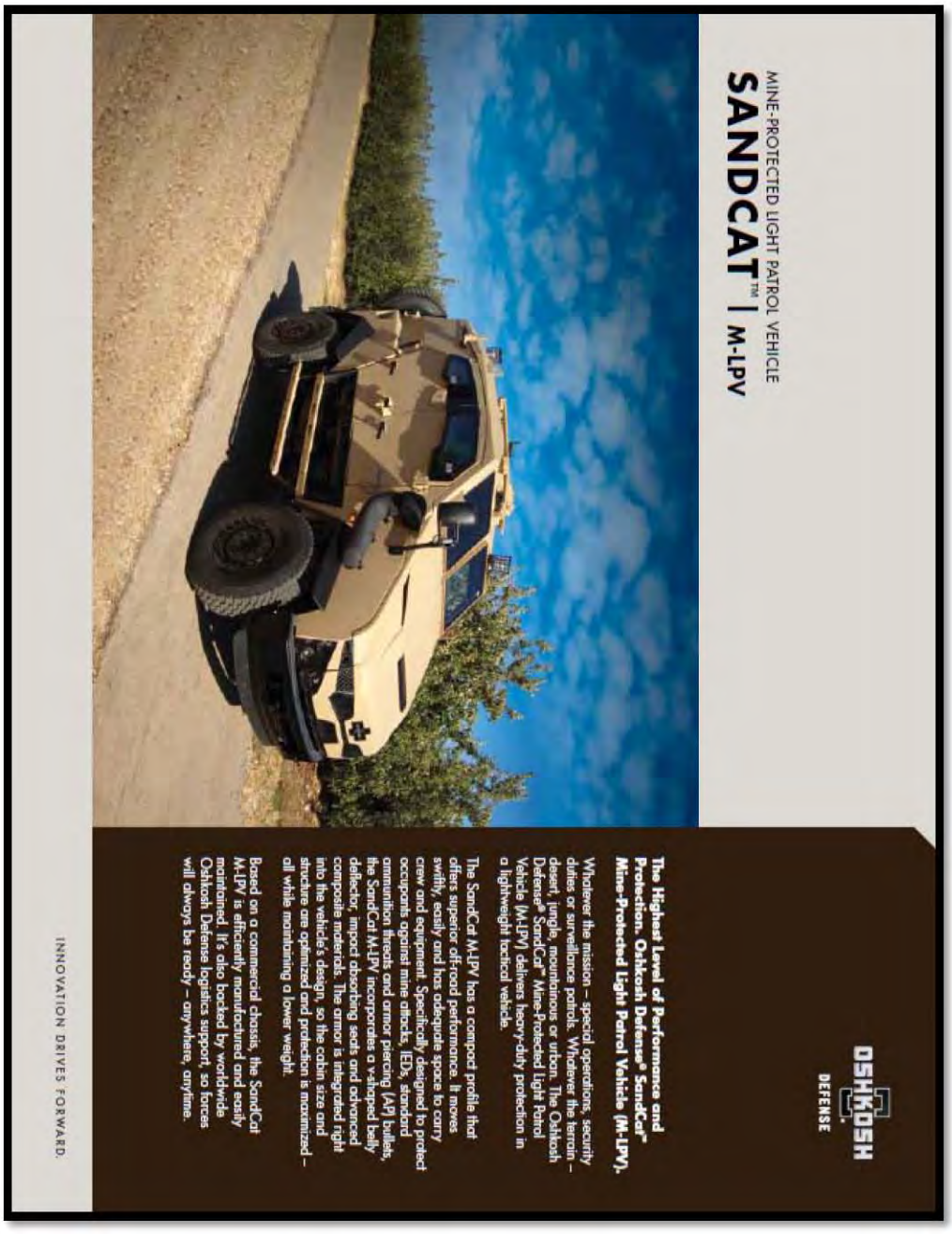
The battery-powered vehicle has a very low visual, acoustic and thermal signature. AeroVironment says the the weapon can also be deployed from submarines, ground vehicles and a manned, as well as unmanned, aircraft.

The company already produces the Wasp III micro-UAV for the U.S. Special forces and Marine Corps and in 2008 has been awarded a development project for the "Stealthy, Persistent, Perch and Stare (SP2S) UAS", based on a modified WASP design.[13]

[13] Defense Update Website http://defense-update.com/products/l/switchblade_31122010.html (accessed March 20, 2012)

Appendix 11 – SANDCAT, M-LPV[14]

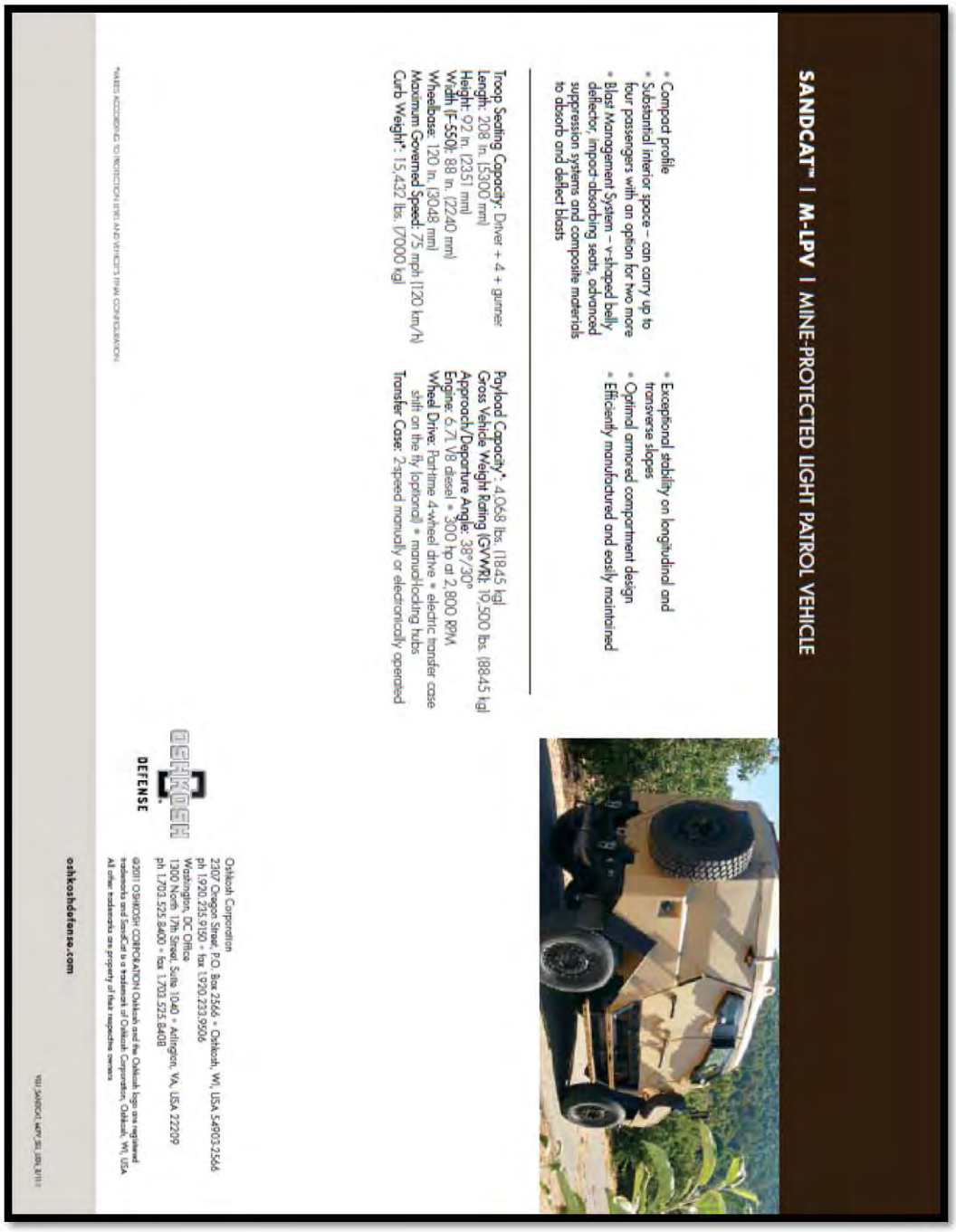
Authors Note: Rear seating would require modifications to allow for six passengers.



[14] Oshkosh Website: http://www.oshkoshdefense.com/products/1/sandcat/10/mine-protected-light-patrol-vehicle-m-lpv (accessed 23 March, 2012)

Appendix 11 – SANDCAT, M-LPV[15]

Authors Note: Rear seating would require modifications to allow for six passengers.



SANDCAT™ | M-LPV | MINE-PROTECTED LIGHT PATROL VEHICLE

- Compact profile
- Substantial interior space – can carry up to four passengers with an option for two more
- Blast Management System – v-shaped belly deflector, impact-absorbing seats, advanced suppression systems and composite materials to absorb and deflect blasts
- Exceptional stability on longitudinal and transverse slopes
- Optimal armored compartment design
- Efficiently manufactured and easily maintained

Troop Seating Capacity: Driver + 4 + gunner
Length: 208 in. (5300 mm)
Height: 92 in. (2351 mm)
Width (F-550): 88 in. (2240 mm)
Wheelbase: 120 in. (3048 mm)
Maximum Governed Speed: 75 mph (120 km/h)
Curb Weight*: 15,432 lbs. (7000 kg)

Payload Capacity*: 4,068 lbs. (1845 kg)
Gross Vehicle Weight Rating (GVWR): 19,500 lbs. (8845 kg)
Approach/Departure Angle: 38°/30°
Engine: 6.7l V8 diesel • 300 hp at 2,800 RPM
Wheel Drive: Part-time 4-wheel drive • electric transfer case shift on the fly (optional) • manual-locking hubs
Transfer Case: 2-speed manually or electronically operated

*VARIES ACCORDING TO VEHICLE CONFIGURATION

OSHKOSH DEFENSE

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oshkoshdefense.com

[15] Oshkosh Website: http://www.oshkoshdefense.com/products/1/sandcat/10/mine-protected-light-patrol-vehicle-m-lpv (accessed 23 March, 2012)

Appendix 12 – LHA(R)[16]

LHA 6 is a large-deck amphibious ship designed to support a notional mix of 12 MV-22s, six F-35B Joint Strike Fighters (Short Take-Off, Vertical Landing variant), four CH-53Es, seven AH-1s/UH-1s, and two embarked H-60 Search and Rescue (SAR) aircraft, or an F-35B load-out of 20 aircraft and two H-60 SAR aircraft.

- It does not have a well deck, which is traditionally used for amphibious operations. Instead, the space will allow for greater aviation stores capacity and an increase in the size of the hangar bay to accommodate two MV-22 high-hat areas for maintenance. Shipboard medical spaces were reduced by approximately two-thirds compared to contemporary LHDs to expand the hangar bay.
- Hangar facilities will better accommodate MV-22s and F-35Bs, in addition to all Navy and Marine Corps helicopters.
- The combat system includes the Ship Self-Defense System (SSDS) Mk 2 and the Close-In Weapon System Block 1B for defense against air threats and small surface craft. The SSDS Mk 2 integrates the AN/SPS-48E long-range air search radar, AN/SPQ-9B horizon search radar, Cooperative Engagement Capability, Rolling Airframe Missiles, Evolved SeaSparrow Missiles, and AN/SLQ-32B(V)2 electronic warfare systems with Mk 53 NULKA electronic decoys into a single command and control system for both hard and soft kill.
- Propulsion is provided by two marine gas turbine engines, two electric auxiliary propulsion motors, and two controllable pitch propellers. Six diesel generators provide electric power.
- Command, control, communications, computers, and intelligence (C4I) facilities and equipment to support Marine Corps Landing Force operations are part of the program of record.

[16] Office of the Secretary of Defense Website: http://www.dote.osd.mil/pub/reports/FY2008/pdf/navy/2008lha6.pdf (Accessed March 20, 2012)

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